HP StorageWorks LUN Configuration Manager XP user's guide

XP48
XP256
XP512

This guide explains how to use the HP StorageWorks LUN Configuration Manager XP software.

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Contents

About this guide

This guide explains how to use the HP StorageWorks LUN Configuration Manager XP option.

Intended audience

Intended users of this guide are system administrators who have expertise with the associated systems and software and these related topics:

- data processing concepts

- direct-access storage device subsystems and their basic functions

- disk arrays and RAID technology

- operating system commands and utilities

Disk arrays

Unless otherwise noted, the term *disk array* refers to any of these products:

HP Surestore Disk Array XP256
HP Surestore Disk Array XP512
HP Surestore Disk Array XP48

Related documentation

HP provides the following related documentation:

- *HP StorageWorks Command View XP for XP Disk Arrays: User Guide*

- *HP StorageWorks Remote Control XP: User's Guide*

For information about operating system commands and third-party products, refer to the manufacturer's documentation.

Conventions

This guide uses the following text conventions.

Figure 1	Blue text represents a cross-reference. For the online version of this guide, the reference is linked to the target.
www.hp.com	Underlined, blue text represents a website on the Internet. For the online version of this guide, the reference is linked to the target.
literal	Bold text represents literal values that you type exactly as shown, as well as key and field names, menu items, buttons, file names, application names, and dialog box titles.
variable	Italics indicates that you must supply a value. Italics is also used for manual titles.
`input/output`	Monospace font denotes user input and system responses, such as output and messages.
Example	Denotes an example of input or output. The example may not exactly match your configuration.
[ ]	Indicates an optional parameter.
{ }	Indicates that you must specify at least one of the listed options.
|	Separates alternatives in a list of options.

Getting help

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www.hp.com

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thenew.hp.com/country/us/eng/support.html

Be sure to have the following information available before calling:

- technical support registration number (if applicable)
- product serial numbers
- product model names and numbers
- applicable error messages
- operating system type and revision level
- detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP storage website

The HP website has the latest information on this product, as well as the latest drivers. Select the appropriate product or solution from this website:

thenew.hp.com/country/us/eng/prodserv/storage.html

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United States	1-800-345-1518
Canada	1-800-263-5868
elsewhere	See the HP website for locations and telephone numbers: www.hp.com

Revision history

May 5, 1999	Published original edition for XP256.
June 1, 2000	Added support for XP512. Reformatted as a separate manual.
November, 2003	General update.

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Introduction

LUN Configuration Manager XP enables you to define the SCSI-to-logical device (LDEV) paths for the disk array using the remote console PC. Each LDEV can be mapped for access from multiple ports or multiple target IDs to provide alternate paths for continuous data availability.

LUN Configuration Manager XP allows you to reconfigure the SCSI/Fibre Channel paths at any time to optimize disk array performance and accommodate system configuration changes, such as adding a host.

To maximize data access capabilities, the logical unit size expansion (LUSE) feature allows you to create virtual logical units that are larger than standard LUNs. These logical units can also be released.

Installation requirements

See your HP account representative for specific requirements.

The system requirements for the LUN Configuration Manager XP software are as follows:

- HP StorageWorks Remote Control XP installed on system
- LUN Configuration Manager XP software license keys needed to enable the feature—LUNM and LUSE
- HP Surestore Disk Array
- Remote console PC with Windows 95, Windows 98, Windows NT, Windows 2000, or Windows XP

Important terms and concepts

You should be familiar with the following terms and concepts:

- controller

  The disk array has one controller which controls data access and storage operations. The disk array controller supports OPEN-*x* emulation modes.

- CU (control unit)

  Each CU controls up to 256 LDEVs (XP256) or 512 LDEVs (XP512). The CUs are numbered sequentially from 0 to E.

- LDEV (logical device)

  An LDEV results when a RAID group is divided into parts according to the emulation mode selection (OPEN-*x*). The number of resulting LDEVs depends upon the selected emulation mode.

- parity group

  A parity group is a set of hard disk drives that have the same capacity and are treated as one group. For example, a parity group of 18-GB disk drives in a RAID5 configuration consists of four disk drives (three data and one parity).

- volume

  An LDEV can also be called a volume. The LDEV ID is internal to the disk array and is not related to the volume serial number (volser) or LUN number.

- path

  A SCSI or Fibre Channel port ID, a SCSI target ID (TID), and a LUN number.

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Installation

LUN Configuration Manager XP is an option and requires a license key. You must have either the LUNM and LUSE key floppy disks (XP256) or text string keys for LUMN and LUSE (XP512).

To perform the installation, HP StorageWorks Remote Control XP (RC) software must be installed, and you must have RC administrator privileges.

LUN Configuration Manager XP must be installed before you can install the LUSE (LUN Size Expansion) or LUN Security options.

The installation procedure for LUN Configuration Manager is different for the XP256 and the XP512. See the section in this chapter that matches your system.

Installing LUN Manager on the XP256

LUN Manager is an option and the license keys must be purchased. Before you begin, be sure you have the key disk for LUN Configuration Manager and LU Size Expansion.

To install the LUN Manager on an XP256:

1. Log in as an administrator.

2. On the Remote Console Main window, select Option to open the Option Product window.

   This window shows the current installation status of the RC options.
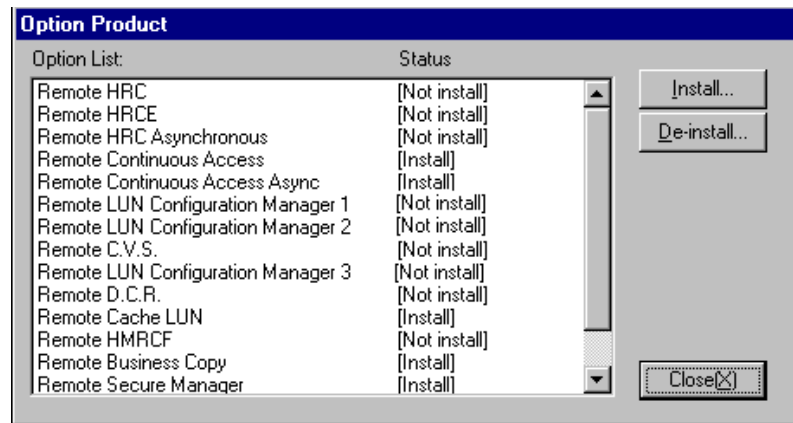
3. Select "Remote LUN Configuration Manager 1" (LUN Configuration Manager) and "Remote LUN Configuration Manager 2" (LU Size Expansion) from the option list. These options install both LUN Manager and LU Size Expansion.

4. Select the Install button.

5. Select the Close button.

   You are prompted to insert the LUNM and LUSE key floppy disks.

6. Insert the LUMN key disk in the floppy drive.

7. Select OK.

8. Insert the LUSE key disk in the floppy drive.

9. Select OK.

   When this option installation is complete, the Option Product window opens and the displayed status of the selected option changes from Not install to Install.

10. Select Close to return to the Remote Console Main window.

Installing LUN Manager on the XP512

LUN Manager is an option and the license keys must be purchased. Before you begin, be sure you have the license keys for LUN Configuration Manager and LU Size Expansion.

To install the LUN Manager on an XP512:

1. Log in as an administrator.

2. On the Remote Console Main window, select Option to open the Option Product window.

   This window shows the current installation status of the RC options.

Option Product		
Option List:	Status	
Remote HRC	[Not install]	Install...
Remote HRCE	[Not install]	De-install...
Remote HRC Asynchronous	[Not install]	
Remote Continuous Access	[Install]	
Remote Continuous Access Async	[Install]	
Remote LUN Configuration Manager 1	[Not install]	
Remote LUN Configuration Manager 2	[Not install]	
Remote C.V.S.	[Not install]	
Remote LUN Configuration Manager 3	[Not install]	
Remote D.C.R.	[Not install]	
Remote Cache LUN	[Install]	
Remote HMRCF	[Not install]	
Remote Business Copy	[Install]	
Remote Secure Manager	[Install]	Close(X)
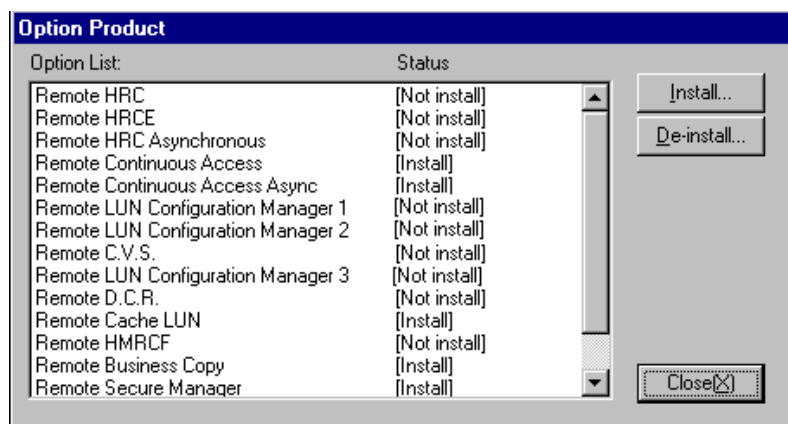
3. Select "Remote LUN Configuration Manager 1" from the option list to install LUN Configuration Manager.

4. Select the Install button.

   The Input Key Code window opens.

5. Enter the license key (password) in the Key Code text box for LUN Configuration Manager.
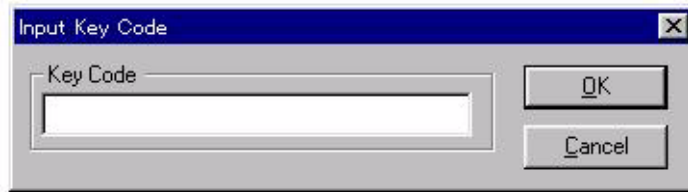
6. Select OK

   If the password is approved, the Program Product window opens.

   This window shows the product name—LUNM, model name (for example, P-242R-E4241), key kind (for example, Permanent), and effective term (for example, Free).

7. After confirming the content of the Program Product window, select OK.

   When this option installation is complete, the Option Product window opens and the displayed status of the selected option changes from Not install to Install.

8. Select "Remote LUN Configuration Manager 2" from the option list to install LU Size Expansion.

9. Repeat steps 5 through 7 for LU Size Expansion.

10. Select Close to return to the Remote Console Main window.

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Operation

LUN management operations can be performed by users with administrator or custom access privileges. Users without these privileges can only view the SCSI path information for attached disk arrays.

LUN management operations include:

- starting LUN Manager
- adding and deleting SCSI paths
- setting the host mode
- setting and resetting the command device
- configuring the Fibre Channel
- creating and releasing expanded LUNs

Starting LUN management operations

To start LUN management operations:

1. Start and log in to the HP StorageWorks Remote Control XP (RC) program.

2. Select the Connect button.

3. Select a disk array to be managed in the Connect window.

4. Select the Connect button to connect the disk array.

5. Select LUN Management to start LUN management operations.

   After the disk array is connected, the RMSCSI window opens.
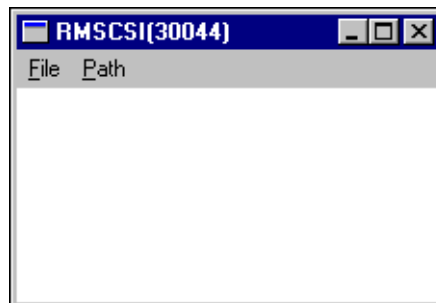
6. Select a mode from the Path pull-down menu.
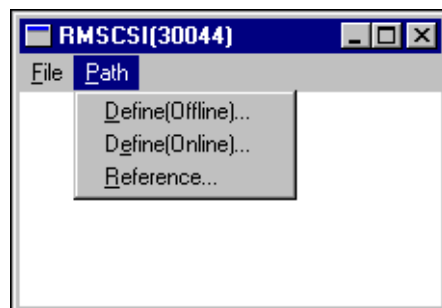
7. The LUN Management-LDEV Configuration window opens.

Define(Offline)	The disk array is not servicing I/Os-to-LUNs on ports that are being modified. You can add or delete paths and modify port configurations.
Define(Online)	The disk array continues to service all I/Os. You can only add new paths.
Reference	The array continues to service all I/Os. No changes are allowed. You can only view path and port information.

This window provides access to all LUN management operations.

The LUN Management-LDEV Configuration window displays SCSI path information for the connected disk array and provides access to SCSI path functions. This window opens at the beginning of LUN management operations, and also at the end of LUN management operations so you can view and confirm changes. The following options are accessible from the LUN Management-LDEV Configuration window:

Option	Description
Port button and pull-down selection box	Selects a particular port to display the SCSI path IDs for that port. The information can be sorted by numerical order or by type using the SCSI ID, LUN, or Volume buttons
Volume button and CU and LDEV pull-down selection boxes	Selects a particular CU and then selects an LDEV within that CU to display the SCSI path IDs for that volume. If you select this option, only the SCSI path for that device will be displayed, and the SCSI ID, LUN, and Volume buttons are unavailable.
Path List box	Displays the path configuration for the selected port or volume. A plus sign next to an LDEV ID (for example, 0:01+) indicates that there is a path to that LDEV. Two plus signs (for example, 0:01++) indicate that there are multiple SCSI paths to that LDEV. If there are no plus signs next to the LDEV ID, there are no SCSI paths defined to that LDEV.
Port SCSI ID, LUN, and Volume buttons	Sorts the path information in different ways for volume view.
Host Mode button	Opens the Port Mode Information window to allow you to set the host mode for one or more ports.
Fibre button	Provides access to the Fibre Channel configuration functions.
OpenVOL button	Opens the LU Expansion Define window to allow you to create expanded volumes.
Add button	Opens the Set LUN Management Parameter window to allow you to create new paths.
Delete button	Opens the Delete LUN Management window to allow you to delete paths.
Cmd.Dev button	A toggle switch that allows you to set or unset a volume as a command device for Command Control Interface operations.
Free SCSI ID and Free Volume boxes	Displays the unassigned SCSI target IDs for the selected port and free LDEVs in the disk array. The window shows information based on the selected port or the selected volume.

Adding and deleting SCSI/Fibre Channel paths

LUN management operations on the remote console PC enable you to add and delete paths to LDEVs in the array. Each LDEV can have multiple paths defined to support failover or load-balancing configurations.

Caution *Before assigning a SCSI path to a LDEV, make sure that the LDEV is not an Auto LUN XP Reserved Device. If the volume has been reserved, it will be write-protected and any writes to that volume will fail. Use Auto LUN XP to verify the reserve status of the LDEVs.*

Adding SCSI/Fibre Channel paths

SCSI and Fibre Channel paths can be added in both online (with concurrent I/Os) or offline (no I/O) modes.

To add SCSI/Fibre Channel paths:

1. Select either online or offline mode from the RMSCSI Path menu.
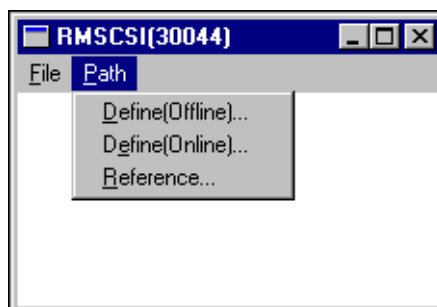
2. Review the information displayed on the LUN Management-LDEV Configuration window to see which paths have already been assigned. A single plus sign (+) next to an LDEV ID (listed under the Volume attribute) indicates that there is an assigned SCSI/fibre path to that LDEV. Two plus signs (++) next to an LDEV ID indicates that there is more than one SCSI path to that LDEV. The label for CMD.Dev next to an LDEV ID indicates that volume is being used as a command device and is not available for SCSI path definition.
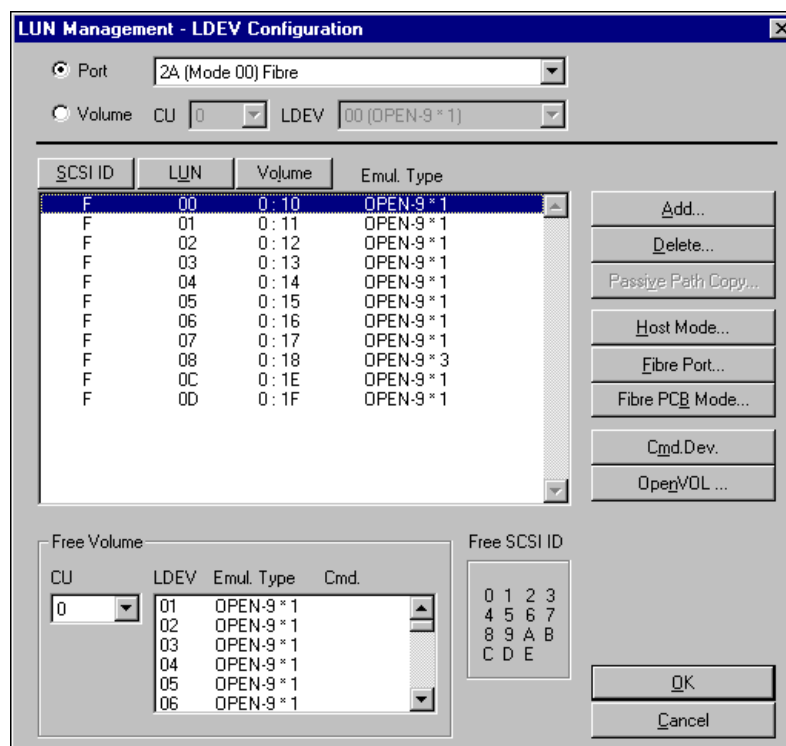
3. Select Add to open the Set SCSI Path Parameter window.

Set SCSI Path Parameter - Fibre Channel

Please select SCSI path parameters.

Channel	Port	SCSI ID	LUN	Volume

Channel
- ○ SCSI
- ● Fibre

Set...

Close(X)

Port
1A
1B
1C
1D
2A
2B
2C
2D

SCSI ID
F

LUN
00
01
02
03
04
05
06
07
08
09
0A
0B
0C
0D
0E
0F

Volume

CU
0

LDEV ID
00+	(OPEN-9 * 1)
01	(OPEN-9 * 1)
02	(OPEN-9 * 1)
03	(OPEN-9 * 1)
04	(OPEN-9 * 1)
05	(OPEN-9 * 1)
06	(OPEN-9 * 1)
07	(OPEN-9 * 1)
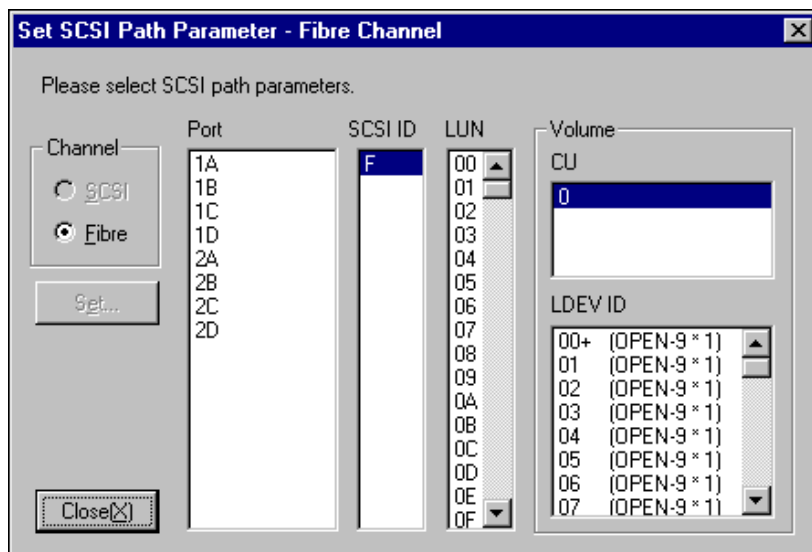
4. Paths can be defined individually (individual mode) or in a group (bulk mode).

(*Individual Mode*) Select PORT, SCSI ID, and LUN one by one for each LDEV ID.

(*Bulk Mode*) Select the desired CU number; then select the SCSI ports, TIDs, and LUN IDs you want to assign; and then select the corresponding LDEV IDs. Select the first LDEV ID and LUN Manager assigns the remaining paths sequentially, or select the specific LDEV IDs you want to assign.

A bulk mode operation will fail if the number of LUNs defined exceeds the number of LDEVs available.

To calculate the number of LUNs to select, multiply the number of selected ports, the number of selected SCSI TIDs, and the number of selected LUN IDs. For example, if you select one port, four SCSI TIDs, and two LUN IDs, you must select eight LUNs ($1 \times 4 \times 2 = 8$).

Set SCSI Path Parameter - Fibre Channel

Please select SCSI path parameters.

Channel	Port	SCSI ID	LUN	Volume

Channel: ○ SCSI ● Fibre

Set...

Close(X)

Port: 1A, 1B, 1C, 1D, **2A**, 2B, 2C, 2D

SCSI ID: F

LUN: 00, 01, 02, 03, 04, 05, 06, 07, 08, **09, 0A, 0B, 0C, 0D**, 0E, 0F

CU: 0

LDEV ID:
18+ (OPEN-9 * 3)
1B (OPEN-9 * 1)
1C (OPEN-9 * 1)
1D (OPEN-9 * 1)
1E (OPEN-9 * 1)
1F (OPEN-9 * 1)
20 (OPEN-9 * 1)
21 (OPEN-9 * 1)
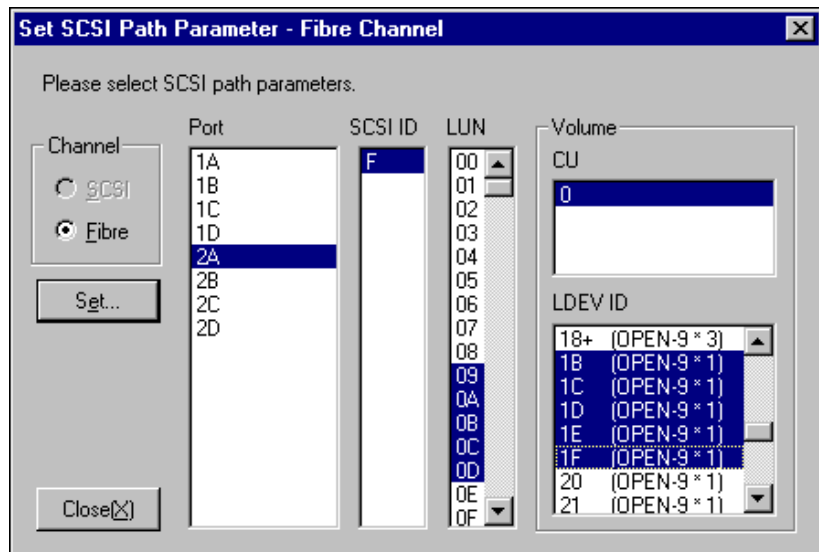
5. When you have completed setting the paths, select Set.

    The Add SCSI Path window opens and displays the SCSI paths to be added.

Add SCSI Path

Port	SCSI ID	LUN	Volume
2A	F	09	0 : 1B
2A	F	0A	0 : 1C
2A	F	0B	0 : 1D
2A	F	0C	0 : 1E
2A	F	0D	0 : 1F

Add these paths.   Cancel   OK
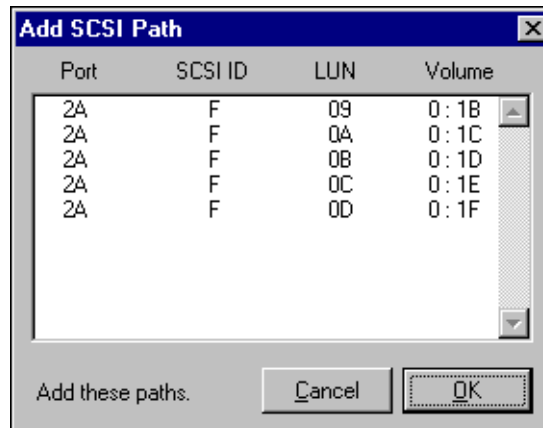
6. Verify that the information presented on the Add SCSI Path window is correct. If the information is not correct, select Cancel to return to the Set Path window. If the information is correct, select OK to save the new path information and return to the LUN Management-LDEV Configuration window.
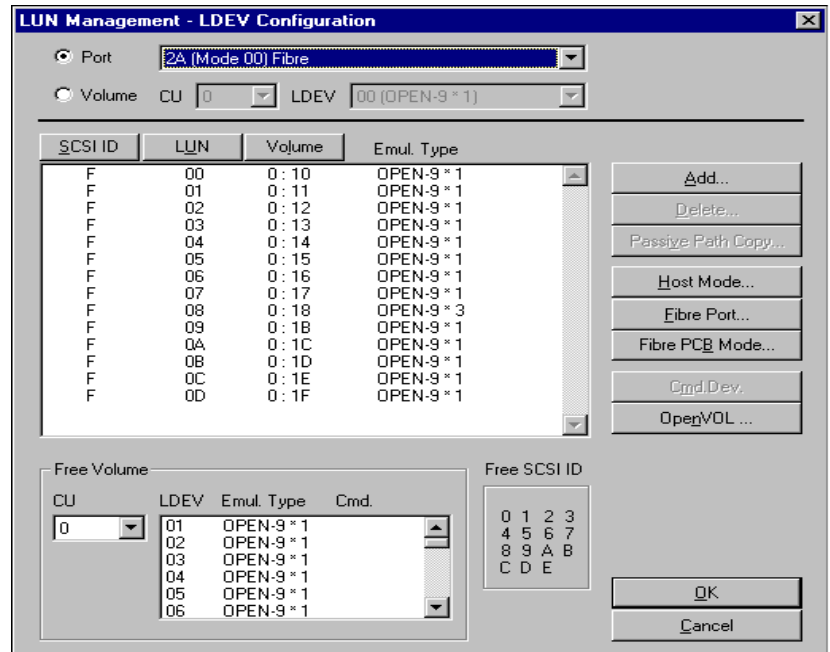
7. To configure the new paths in the array, select OK on the LUN Management-LDEV Configuration window.

    To cancel your request to add new paths, select Cancel.

Deleting SCSI/Fibre Channel paths

SCSI/FC paths can be deleted only in offline mode.

To delete SCSI paths:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.
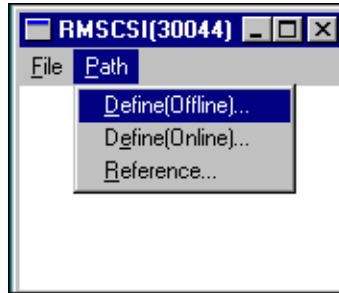
The LUN Management-LDEV Configuration window displays.

2. Review the information displayed on the LUN Management-LDEV Configuration window and select the SCSI paths you want to delete in the LUN Management box.

Use the Ctrl key to select more than one path.
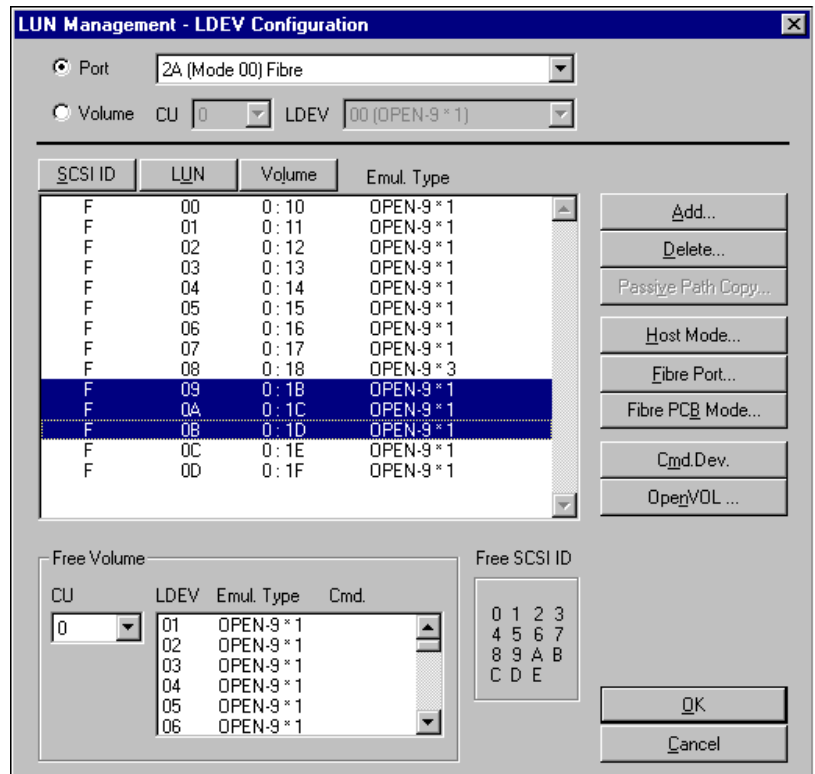
3. Select Delete to open the Delete LUN Management window.

The Delete LUN Management window displays the selected SCSI paths to be deleted.

Delete SCSI Path

Port	SCSI ID	LUN	Volume
2A	F	09	0 : 1B
2A	F	0A	0 : 1C
2A	F	0B	0 : 1D

Delete these paths.   Cancel   OK
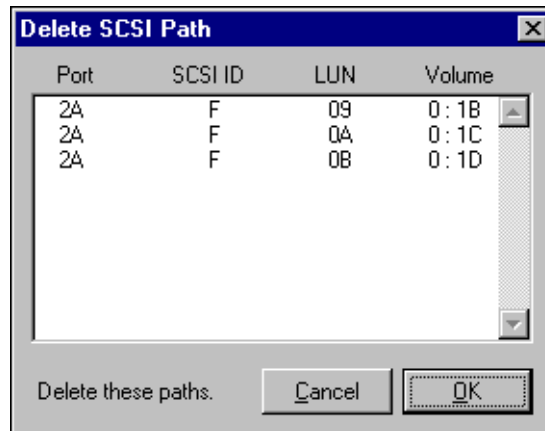
4. Verify that the information presented on the Delete LUN Management-LDEV Configuration window is correct.

5. If the information is correct, select OK.

    If the information is not correct, select Cancel.

    The LUN Management-LDEV Configuration window opens.

LUN Management - LDEV Configuration

⊙ Port	2A (Mode 00) Fibre		▼
○ Volume	CU 0 ▼ LDEV 00 (OPEN-9 * 1)		▼

SCSI ID	LUN	Volume	Emul. Type	
F	00	0 : 10	OPEN-9 * 1	Add...
F	01	0 : 11	OPEN-9 * 1	Delete...
F	02	0 : 12	OPEN-9 * 1	Passive Path Copy...
F	03	0 : 13	OPEN-9 * 1	
F	04	0 : 14	OPEN-9 * 1	Host Mode...
F	05	0 : 15	OPEN-9 * 1	Fibre Port...
F	06	0 : 16	OPEN-9 * 1	
F	07	0 : 17	OPEN-9 * 1	Fibre PCB Mode...
F	08	0 : 18	OPEN-9 * 3	
F	0C	0 : 1E	OPEN-9 * 1	Cmd Dev.
F	0D	0 : 1F	OPEN-9 * 1	OpenVOL ...

Free Volume

CU	LDEV	Emul. Type	Cmd.
0 ▼	01	OPEN-9 * 1	
	02	OPEN-9 * 1	
	03	OPEN-9 * 1	
	04	OPEN-9 * 1	
	05	OPEN-9 * 1	
	06	OPEN-9 * 1	

Free SCSI ID

0 1 2 3
4 5 6 7
8 9 A B
C D E

OK

Cancel

6. To delete the selected paths, select OK on the LUN Management-LDEV Configuration window.

   To cancel your request to delete the selected paths, select Cancel.

Setting the host mode

LUN Configuration Manager XP allows you to set the host mode for each SCSI port on the disk array. The following table describes each host mode.

Host Mode FWD	Description	Host Mode Ultra	Description
0x00	Standard mode–fast-wide differential SCSI (FWD) Fibre Channel (FC) Linux, SGI IRIX host mode	0x10	Standard mode and Ultra SCSI mode
0x01	IBM-7135 host mode (FWD)	0x11	IBM-7135 host mode and Ultra SCSI mode
0x02	NCR host mode (FWD)	0x12	NCR host mode and Ultra SCSI mode
0x03	HP-UX Extension host mode	0x13	Not used
0x04	Sequent host mode (FWD)	0x14	Sequent host mode and Ultra SCSI mode
0x05	Open VMS host mode	0x15	Not used
0x07	Tru64 host mode		
0x08	HP-UX mode (FWD or FC) Queue depth: 1024 LUNs per port: 120 HP NetServer with HP host bus adapters (HBAs)	0x18	HP-UX and Ultra SCSI mode
0x09	VxVM-DMP (FWD)	0x19	VxVM-DMP and Ultra SCSI mode
0x0A	Netware host (FWD)	0x1A	Netware host and Ultra SCSI mode
0x0C	PC Server, Windows NT/2000, MS Cluster Server (Wolfpack)–Non-HP HBAs (FWD)	0x1C	MS Cluster Server (Wolfpack) and Ultra SCSI mode–Non-HP HBAs
0x0D	I/O TRACE mode		
0x0F	AIX host mode	Others	Not used

To set the host mode:

Caution *Before changing the host mode, back up the data on the port of the host mode you want to change. The set host mode operation is not destructive; however, data integrity cannot be guaranteed without a backup.*

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.
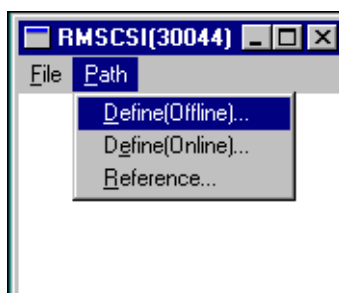
2. Select Host Mode on the LUN Management-LDEV Configuration window to open the Host Mode Information window.

   The Host Mode Information window displays the current host mode setting for each port.
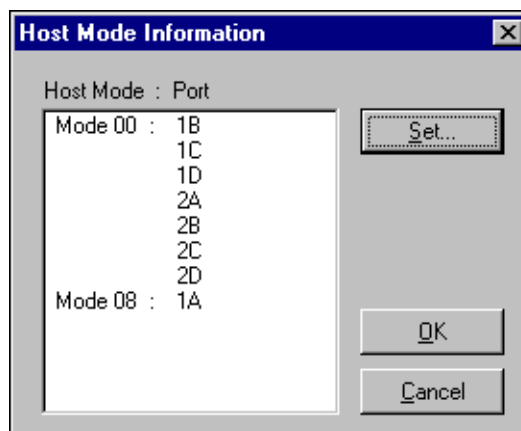
3. Select Set to open the Set Host Mode window.

Set Host Mode

Please select Host Mode and Port(s).

Host Mode

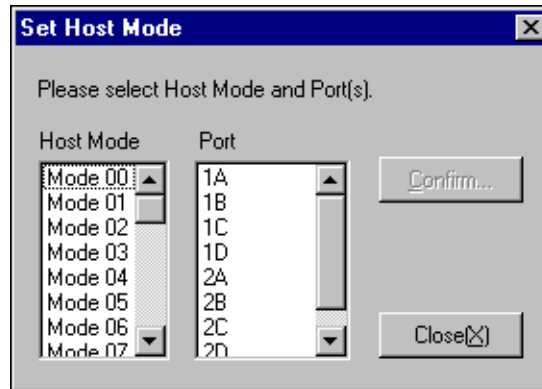| Mode 00 |
| Mode 01 |
| Mode 02 |
| Mode 03 |
| Mode 04 |
| Mode 05 |
| Mode 06 |
| Mode 07 |

Port

| 1A |
| 1B |
| 1C |
| 1D |
| 2A |
| 2B |
| 2C |
| 2D |

Confirm...

Close(X)

4. Select the mode in the Mode box, then select the desired ports in the Port box.

Set Host Mode

Please select Host Mode and Port(s).

Host Mode

| Mode 02 |
| Mode 03 |
| Mode 04 |
| Mode 05 |
| Mode 06 |
| Mode 07 |
| Mode 08 |
| Mode 09 |

Port

| 1A |
| 1B |
| 1C |
| 1D |
| 2A |
| 2B |
| 2C |
| 2D |

Confirm...

Close(X)
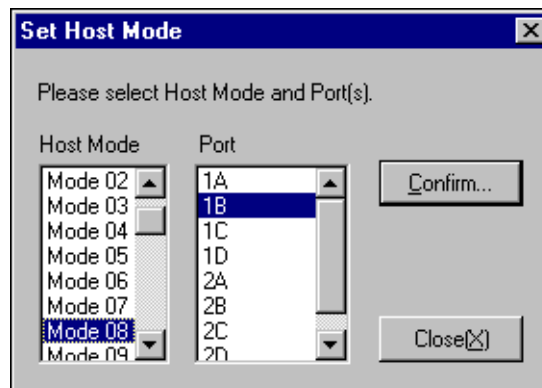
5. Select Confirm**.**

The Mode Confirmation window now opens.
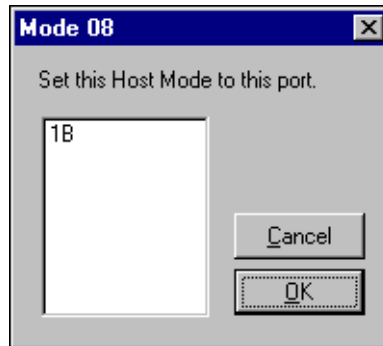
6. Make sure the mode and ports are displayed correctly in the Mode Confirmation window.

If not, select Cancel and repeat this procedure.

If so, select OK.

The Host Mode Information window now displays the new host mode settings.
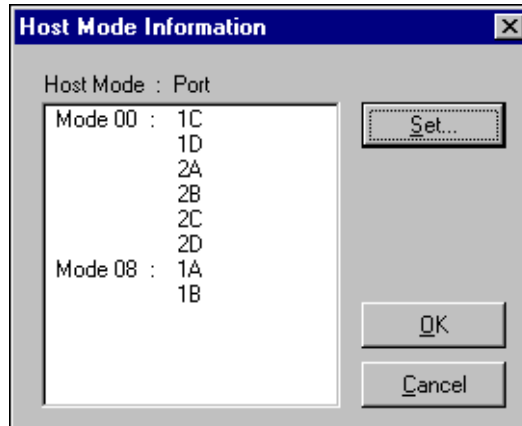
7. If the new settings in the Set Port Mode window are not correct, select Cancel and repeat steps 2 through 4.

If the new settings are correct, select OK.

The LUN Management-LDEV Configuration window now displays the new host mode settings.
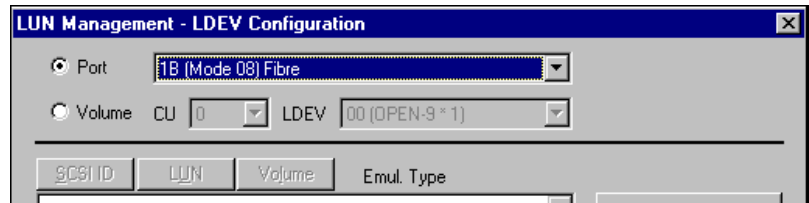
8. To implement the new host mode settings, select OK.

To cancel the new host mode settings, select Cancel.

Setting/resetting a command device

A volume that is configured as a command device allows applications such as RAID Manager to communicate with a disk array.

To set a command device:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.
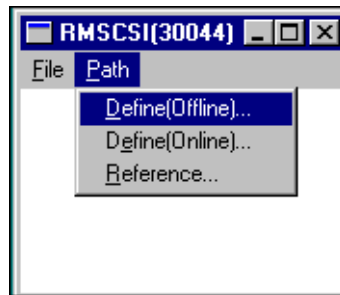
2. From the LUN Management-LDEV Configuration window, select the SCSI paths in the SCSI path list.

HP StorageWorks LUN Configuration Manager XP: user's guide
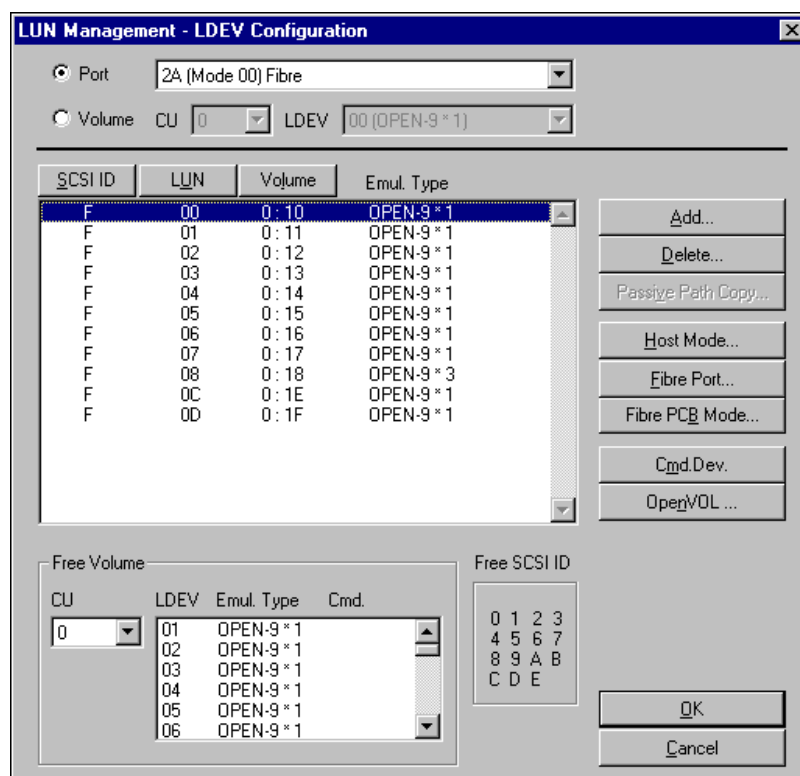
3. Select the Cmd.Dev. button.

The label "[for Cmd.]" displays in the SCSI path list next to the path.
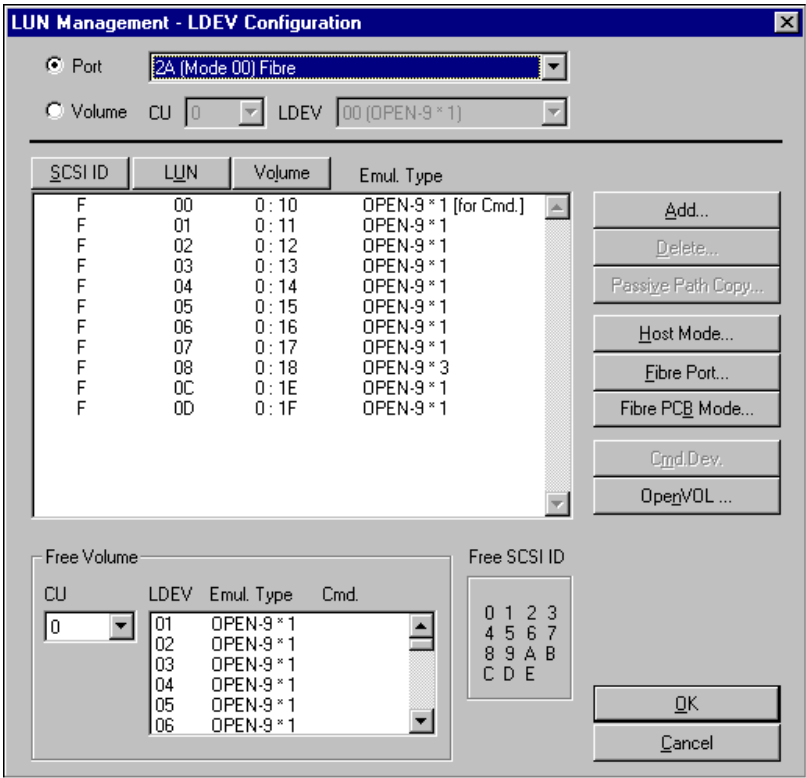
To reset a command device:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.

HP StorageWorks LUN Configuration Manager XP: user's guide
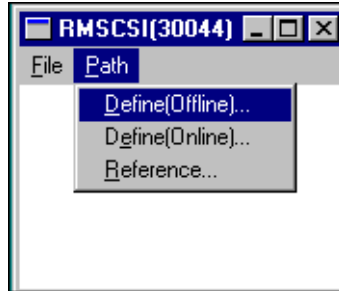
2. From the LUN Management-LDEV Configuration window, select the SCSI paths with the "[for Cmd.]" label in the SCSI path list.
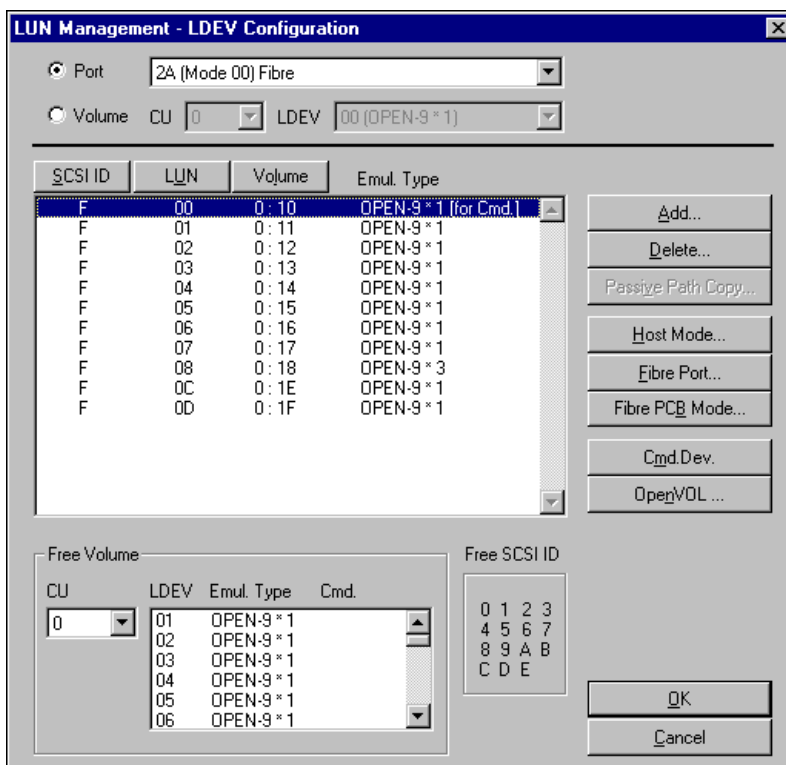
3. Select the Cmd.Dev. button.

    The label "[for Cmd.]" is deleted in the SCSI path list.

HP StorageWorks LUN Configuration Manager XP: user's guide
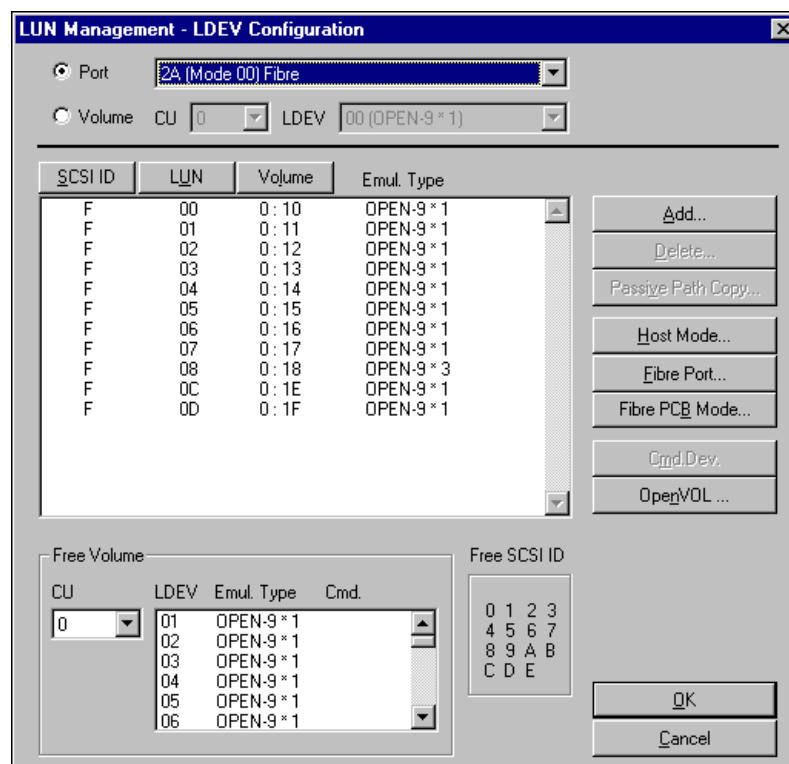
Configuring Fibre Channel ports

Fibre Channel configuration includes setting the port address and topology.

Setting the Fibre Channel port address

To set the Fibre Channel port address:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.
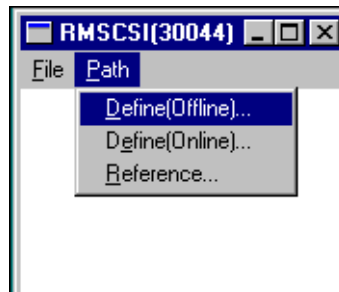
The SCSI Path-LDEV Configuration menu displays.
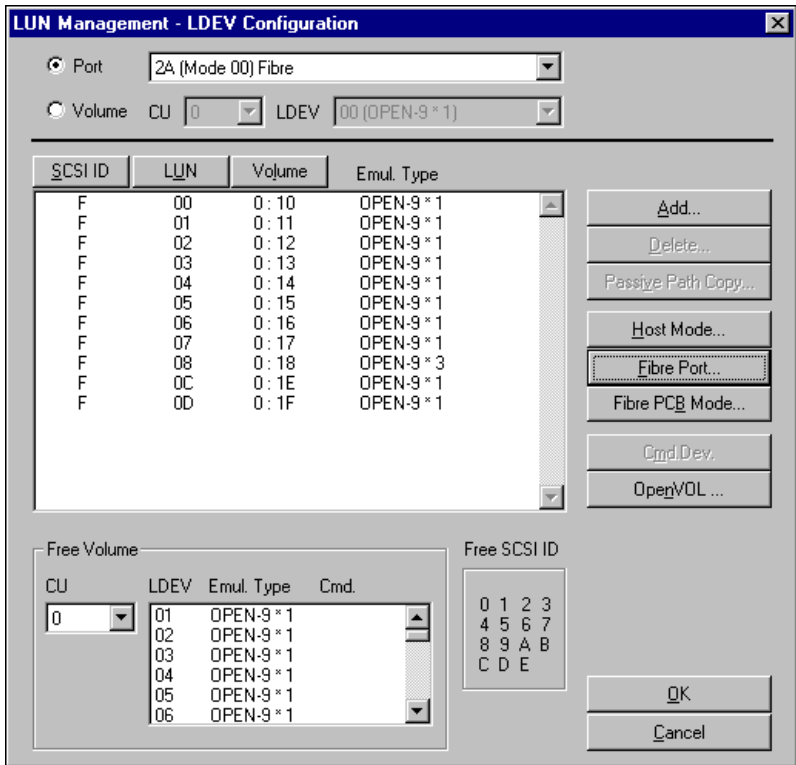
2. On the SCSI Path-LDEV Configuration menu, select the Fibre button.

    The Fibre Information window displays.
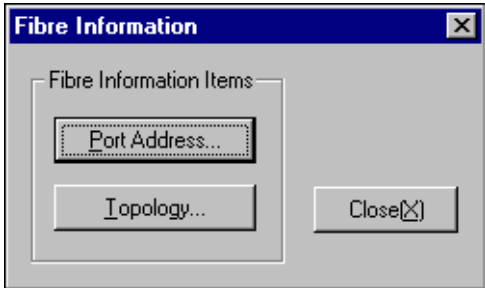
3. Select the Port Address button in the Fibre Information window. The Fibre-Port Address Information window opens to displays port names, arbitrated loop physical addresses, and Loop IDs. If a port has not defined an address yet, its address value will be EF.
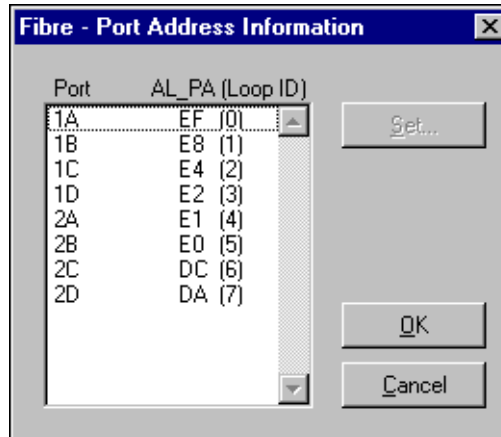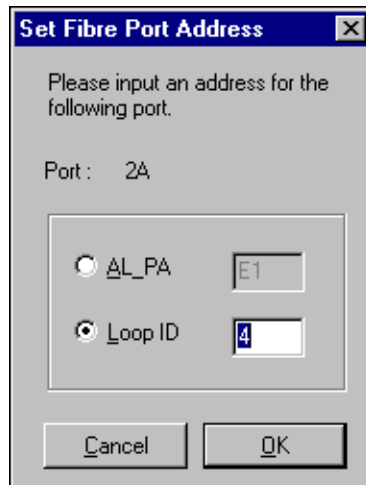
4. Select the ports to be changed.
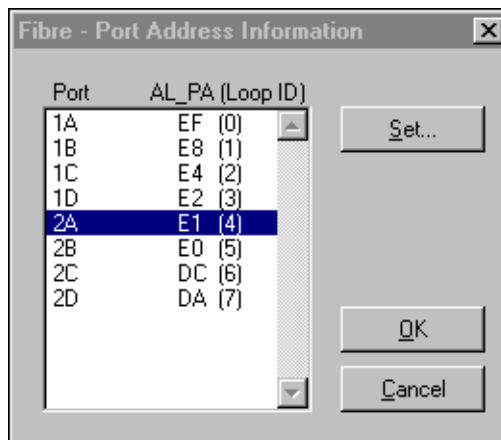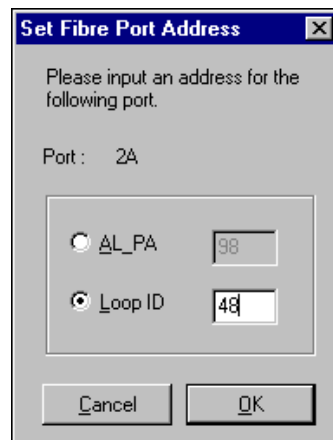
5. Select the Set button.

The Set Fibre Port Address window displays.

6. Select AL-PA or Loop ID and input the address from the following table.

If you select AL_PA, input a value in hexadecimal (01 through EF). If you input only a one-digit number, the function will convert it to a two-digit number. For example, if you input A, it is converted to 0A. If you select Loop ID, input a decimal number (0 to 125). The AL_PA, which is assigned to the Loop ID, is displayed.

AL PA	Loop ID	AL PA	Loop ID	AL PA	Loop ID	AL PA	Loop ID
EF	0	B2	32	72	64	3A	96
E8	1	B1	33	71	65	39	97
E4	2	AE	34	6E	66	36	98
E2	3	AD	35	6D	67	35	99
E1	4	AC	36	6C	68	34	100
E0	5	AB	37	6B	69	33	101
DC	6	AA	38	6A	70	32	102
DA	7	A9	39	69	71	31	103
D9	8	A7	40	67	72	2E	104
D6	9	A6	41	66	73	2D	105
D5	10	A5	42	65	74	2C	106
D4	11	A3	43	63	75	2B	107
D3	12	9F	44	5C	76	2A	108
D2	13	9E	45	5A	77	29	109
D1	14	9D	46	59	78	27	110
CE	15	9B	47	56	79	26	111
CD	16	98	48	55	80	25	112
CC	17	97	49	54	81	23	113
CB	18	90	50	53	82	1F	114
CA	19	8F	51	52	83	1E	115
C9	20	88	52	51	84	1D	116
C7	21	84	53	4E	85	1B	117
C6	22	82	54	4D	86	18	118

Continued

AL PA	Loop ID	AL PA	Loop ID	AL PA	Loop ID	AL PA	Loop ID
C5	23	81	55	4C	87	17	119
C3	24	80	56	4B	88	10	120
BC	25	7C	57	4A	89	0F	121
BA	26	7A	58	49	90	08	122
B9	27	79	59	47	91	04	123
B6	28	76	60	46	92	02	124
B5	29	75	61	45	93	01	125
B4	30	74	62	43	94		
B3	31	73	63	3C	95		

7. Select the OK button.

   The Fibre Information window displays the results of the address change.
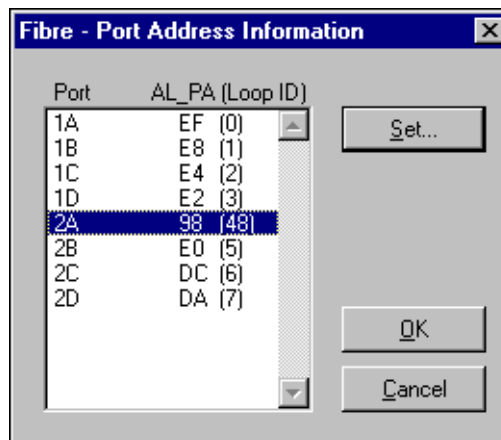
8. If the address change displayed is correct, select the OK button to execute the change.

   If the address change is incorrect, select Cancel.

The Fibre Information window displays.
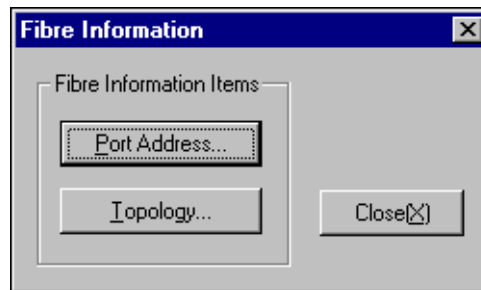
9. Select the Close button on the Fibre Information window.

The LUN Management-LDEV Configuration window displays.
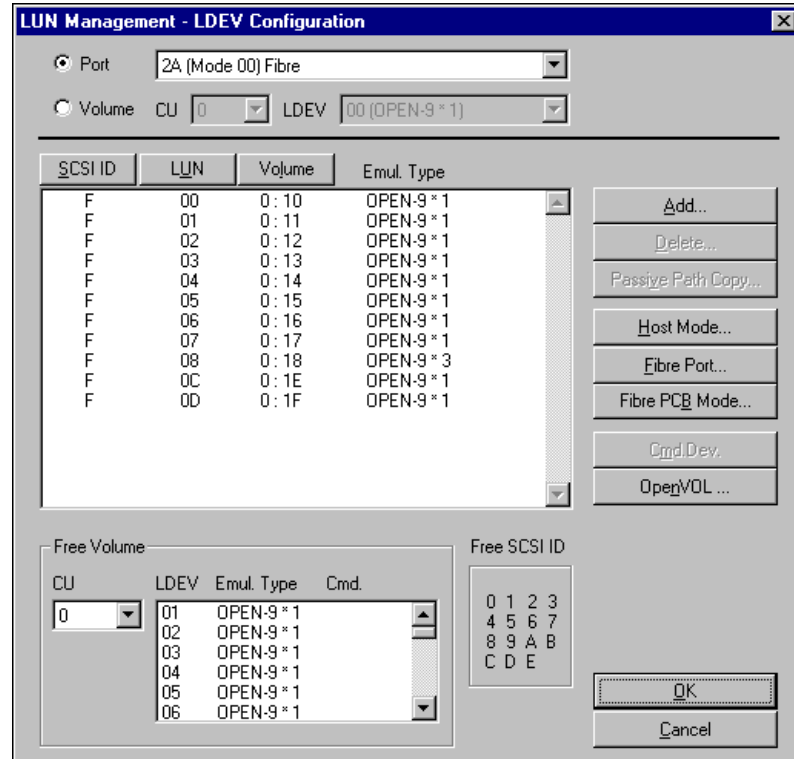
10. To implement the change, select the OK button on the LUN Management-LDEV Configuration window.

To cancel the change, select Cancel.

Setting Fibre Channel topology

To set Fibre Channel topology:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.
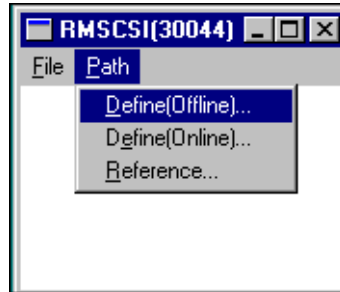
The LUN Management-LDEV Configuration menu displays.

2. On the LUN Management-LDEV Configuration menu, select the Fibre button.

The Fibre Information window displays.

3. Select the Topology button.

The Fibre-Topology Information window displays. If a port topology is not set, the fabric setting is OFF and the connection type is FC-AL.

Fibre - Topology Information

Port	Fabric	Connection
1A	OFF	FC-AL
1B	OFF	FC-AL
1C	OFF	FC-AL
1D	OFF	FC-AL
2A	OFF	FC-AL
2B	OFF	FC-AL
2C	OFF	FC-AL
2D	OFF	FC-AL

Set...

OK

Cancel
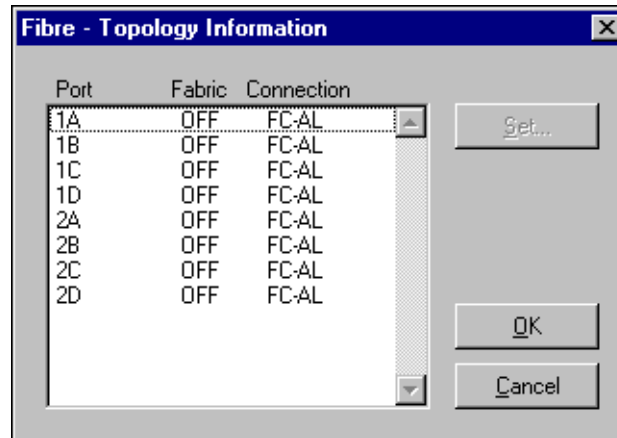
4. Select a port to change its topology. You can select several ports by pressing Ctrl or Shift keys while selecting the ports.

5. Select the Set button.

The Set Fibre Topology window displays.

Set Fibre Topology

Please select topology parameters.

Fabric
○ ON   ⊙ OFF

Connection
⊙ FC-AL   ○ Point to Point

Cancel   OK
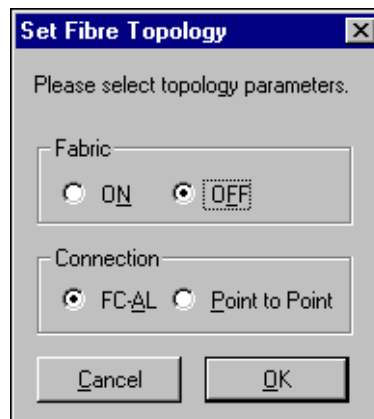
6. Set the topology by selecting an item in both the Fabric (ON or OFF) and Connection (FC-AL or Point to Point) boxes.
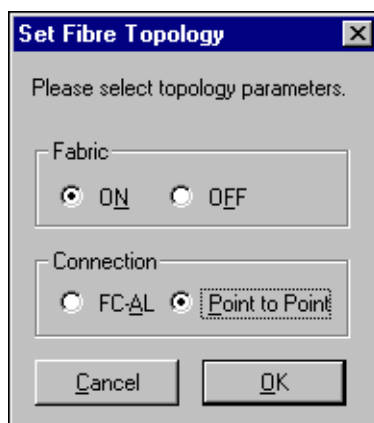
7. Select the OK button.

   The information in the remote console changes and the Fibre -Topology Information window displays with the new information.
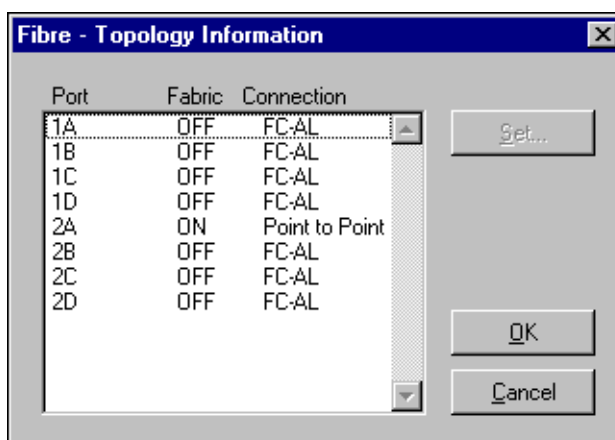
8. Select OK.

The LUN Management-LDEV Configuration window displays.
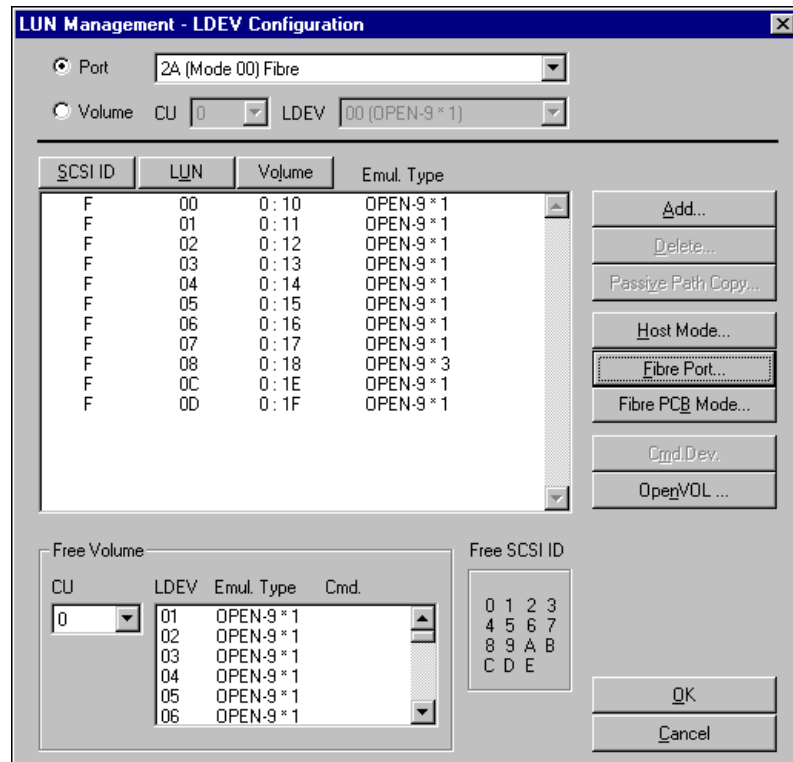
9. To implement the change, select the OK button.

   To cancel the change, select the Cancel button.

LU size expansion

The LU Size Expansion (LUSE) feature allows you to create volumes that are larger than standard OPEN-*x* LDEVs. This capability enables hosts to access the data in the array using fewer logical units. The following tables list the OPEN-x sizes, LUSE size limitations, and (for comparison) VSC size limitations. VSC volumes may also be used with LUSE.

Parameter	OPEN-3	OPEN-8	OPEN-9	OPEN-E	OPEN-K	OPEN-L	OPEN-M
Size of LDEV	2.4 GB	7.3 GB	7.3 GB	14.5 GB	1.8 GB	36.4 GB	47.1 GB

LUSE Parameters	OPEN-3	OPEN-8	OPEN-9	OPEN-E	OPEN-K	OPEN-L	OPEN-M
Possible number of LDEVs in expanded volume	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs
Size of expanded LDEVs	4.8 GB to 88.6 GB	14.6 to 264.4 GB	14.7 to 265.8 GB	29.1 to 524.4 GB	3.7 to 67.7 GB	72.9 to 1312.2 GB	94.3 to 1698.6 GB
LUSE Designation (*n* = number of LDEVs in expanded volume)	OPEN-3*n*	OPEN8*n*	OPEN-9*n*	OPEN-E*n*	OPEN-K*n*	OPEN-L*n*	OPEN-M*n*

VSC Parameters	OPEN-3 VSC	OPEN-8 VSC	OPEN-9 VSC	OPEN-E VSC	OPEN-K VSC	N/A	N/A
Size of LDEV	35 MB to 2.4 GB	35 MB to 7.3 GB	35 MB to 7.3 GB	35 MB to 14.5 GB	35 MB to 1.8 GB	N/A	N/A
Possible number of LDEVs in expanded volume	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	2 - 36 LDEVs	N/A	N/A
Size of expanded LDEVs	70 MB to 84.2 GB	70 MB to 250.2 GB	70 MB to 252.6 GB	70 MB to 524.4 GB	70 MB to 64.1 GB	N/A	N/A
VSC Designation (*n* = number of LDEVs in expanded volume)	OPEN-3*n* VSC	OPEN8*n* VSC	OPEN-9*n* VSC	OPEN-E*n* VSC	OPEN-K*n* VSC	N/A	N/A

Note the following limitations:

- You cannot combine LDEVs from different control units.
- Windows NT hosts cannot access more than 32 logical units.
- Some operating systems may experience slow disk access times with large logical units.

The following are guidelines for LU Size Expansion:

- A maximum of 256 expanded LUNs can be configured on the same port.
- The LDEVs that will become members of the LUSE must not have SCSI paths assigned. These are known as free (or available) LDEVs.
- To make an LDEV free, it must have its SCSI paths deleted, which requires that it be offline (unmounted from all hosts).
- Combining nonsequential LDEVs into a LUSE is supported, provided they are on the same CU.
- Combining customized volumes into a LUSE is supported, provided they have the same size, emulation type, and CU. The order of operations is important: you must first create the volumes, and then combine those volumes into a LUSE volume.
- Combining customized volumes and normal volumes into the same LUSE is not supported.
- Combining command devices into a LUSE is not supported.
- Combining RAID1 and RAID5 into the same LUSE is not supported.
- Combining emulation types (OPEN-*x*) into the same LUSE is not supported.
- Factors relevant to recommended LUSE size include the following: Some operating systems may exhibit slow disk access times with large logical units if they contain too many high usage files. The size of a LUSE can also affect the amount of time required to perform backups.
- The queue depth for open systems can vary depending on the platform.

Creating expanded LUNs

When creating expanded volumes, LDEVs with assigned paths cannot be used. All assigned SCSI paths must be deleted before a selected LDEV can be used for expansion.

To configure an expanded LUN:

1. Select either online or offline mode from the RMSCSI Path menu.
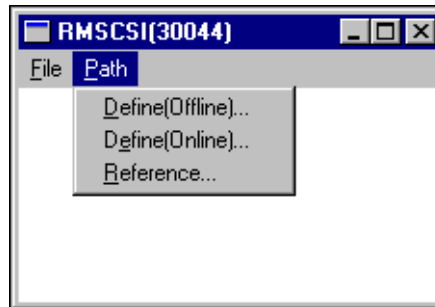
2. Select OpenVol on the LUN Management-LDEV Configuration window to open the LU Expansion Define window.

LU Expansion Define

CU:LDEV	Open VOL	Size(Mbyte)	Path	VSC
0:14	OPEN-9 * 1	7042.50	*	
0:15	OPEN-9 * 1	7042.50	*	
0:16	OPEN-9 * 1	7042.50	*	
0:17	OPEN-9 * 1	7042.50	*	
0:18	OPEN-9 * 3	21127.50	*	
0:1B	OPEN-9 * 1	7042.50		
0:1C	OPEN-9 * 1	7042.50		
0:1D	OPEN-9 * 1	7042.50		
0:1E	OPEN-9 * 1	7042.50	*	
0:1F	OPEN-9 * 1	7042.50	*	
0:20	OPEN-9 * 1	7042.50		
0:21	OPEN-9 * 1	7042.50		
0:22	OPEN-9 * 1	7042.50		

CU: 0

Expand...
Exp(Disperse)...
Free
Detail...

OK   Cancel (X)
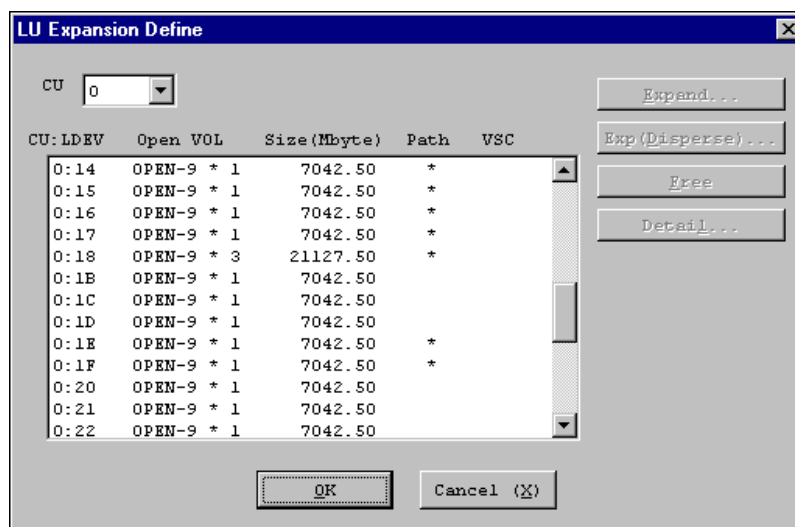
The CU drop-down list allows you to choose the control unit for the LDEVs you want to expand. The list box displays the control unit, LDEV, open volume type (OPEN-*x*), and path status.
If an asterisk (*) appears under the path listing, this indicates that the path has already been set. If there is no asterisk (*), the path has not been set.

Caution   *LUN size expansion is a data destructive operation. Back up data before continuing.*

3. Select the CU that controls the LDEV to be expanded from the CU drop-down list. In the list box, select the LUN you want to expand.
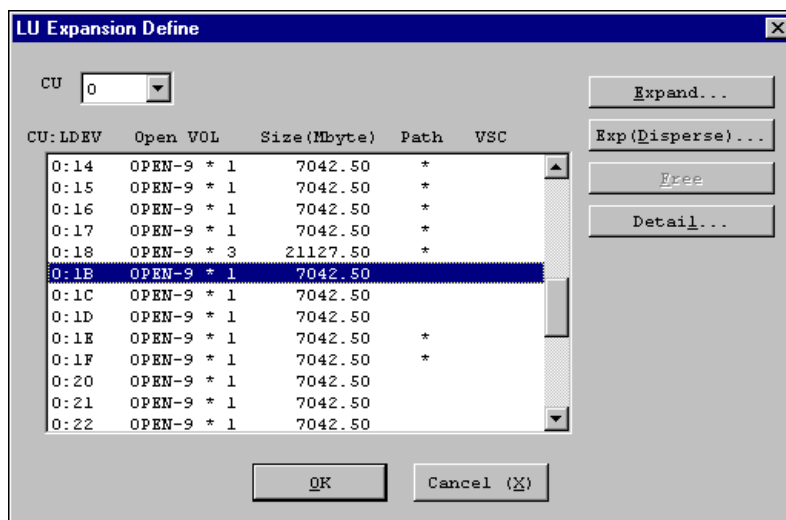
4. Select Expand to open the LU Expansion window.

The following information is displayed:

OPEN-*x**1	Displays the emulation type. All available LDEVs are displayed as OPEN-*X**1 indicating that only one LDEV is present. Volumes that have already been expanded are displayed as OPEN-*X**n, where *n* is the number of LDEVs combined. For example if the volume is displayed as OPEN-3*16, there are 16 LDEVs in that OPEN-3 expanded volume. LDEVs with an asterisk (*) in either the Path or CVS columns are not available for size expansion.
Open VOL	Displays the LDEV that will be expanded.
Valid VOL count	Count displays the available number of LDEVs to combine.
Size [Mbyte]	Overall capacity of the new volume.

5. Enter the number of combined LDEVs in the Enter VOL count box.
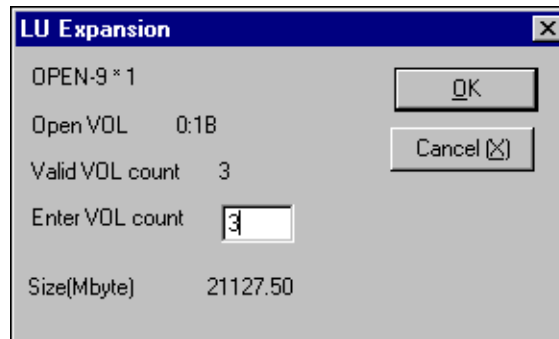
6. Select OK to expand the volume.

The LU Expansion Define window now opens again displaying the newly expanded volume.

LU Expansion Define

CU [0 ▼]

CU:LDEV	Open VOL	Size(Mbyte)	Path	VSC
0:14	OPEN-9 * 1	7042.50	*	
0:15	OPEN-9 * 1	7042.50	*	
0:16	OPEN-9 * 1	7042.50	*	
0:17	OPEN-9 * 1	7042.50	*	
0:18	OPEN-9 * 3	21127.50	*	
0:1B	OPEN-9 * 3	21127.50		
0:1E	OPEN-9 * 1	7042.50	*	
0:1F	OPEN-9 * 1	7042.50	*	
0:20	OPEN-9 * 1	7042.50		
0:21	OPEN-9 * 1	7042.50		
0:22	OPEN-9 * 1	7042.50		
0:23	OPEN-9 * 1	7042.50		
0:24	OPEN-9 * 1	7042.50		

Expand...
Exp(Disperse)...
Free
Detail...

OK   Cancel (X)
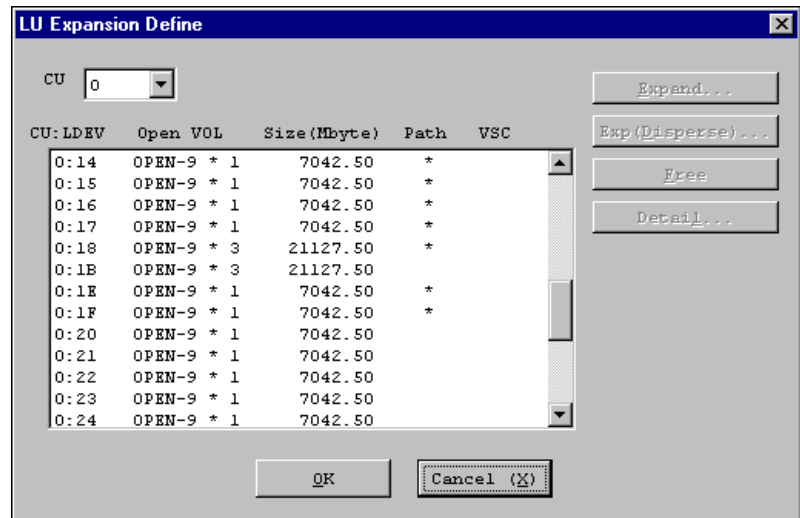
7. To expand another volume repeat steps 3 through 6.

8. To return to the LUN Management-LDEV Configuration window, select OK.

The LUN Management-LDEV Configuration window now displays the new expanded volumes.
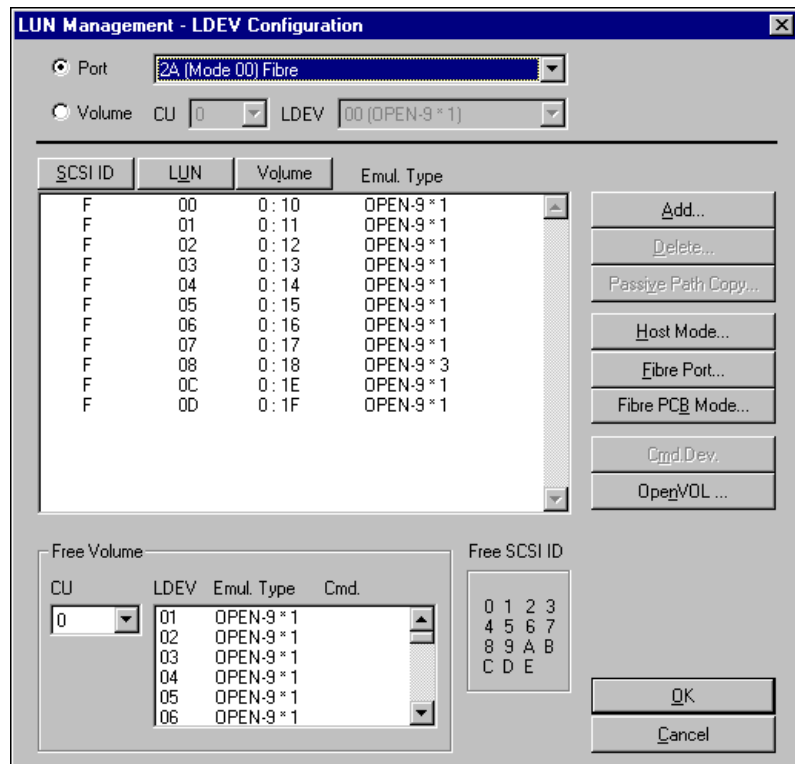
9. Assign a SCSI path to the expanded volume. For the procedure to assign SCSI paths, see "Adding SCSI/Fibre Channel paths" (page 27).

    The LUN Management-LDEV Configuration window displays the new expanded volumes.

10. To implement the expanded LUNs, select OK.

    To cancel the expanded LUNs, select Cancel.

Expanding dispersed LUNs

Caution   *LU size expansion is a destructive operation. Back up all data.*

To configure an expanded dispersed LUN:

1. Select either online or offline mode from the RMSCSI Path menu.
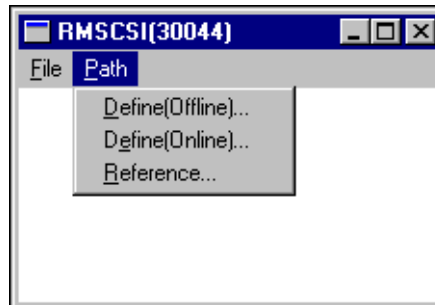
The LUN Management-LDEV Configuration window opens.

2. Select the OpenVOL button.
    The LUN Expansion Define window displays.

3. In the CU:LDEV list box, select the LDEV you want to expand.

```
LU Expansion Define                                              [X]

  CU  [ 0    ▼]                                          [  Expand...  ]

 CU:LDEV    Open VOL      Size(Mbyte)   Path    VSC      [Exp(Disperse)...]
 ┌─────────────────────────────────────────────────┐
 │0:15   OPEN-9 * 1        7042.50       *        ▲│    [     Free      ]
 │0:16   OPEN-9 * 1        7042.50       *         │
 │0:17   OPEN-9 * 1        7042.50       *         │    [  Detail...   ]
 │0:18   OPEN-9 * 3       21127.50       *         │
 │0:1B   OPEN-9 * 3       21127.50       *         │
 │0:1E   OPEN-9 * 1        7042.50       *         │
 │0:1F   OPEN-9 * 1        7042.50       *         │
 │0:20   OPEN-9 * 1        7042.50                 │
 │0:21   OPEN-9 * 1        7042.50                 │
 │0:22   OPEN-9 * 1        7042.50                 │
 │0:23   OPEN-9 * 1        7042.50                 │
 │0:24   OPEN-9 * 1        7042.50                 │
 │0:25   OPEN-9 * 1        7042.50        ▼        │
 └─────────────────────────────────────────────────┘

              [    OK    ]        [  Cancel (X)  ]
```
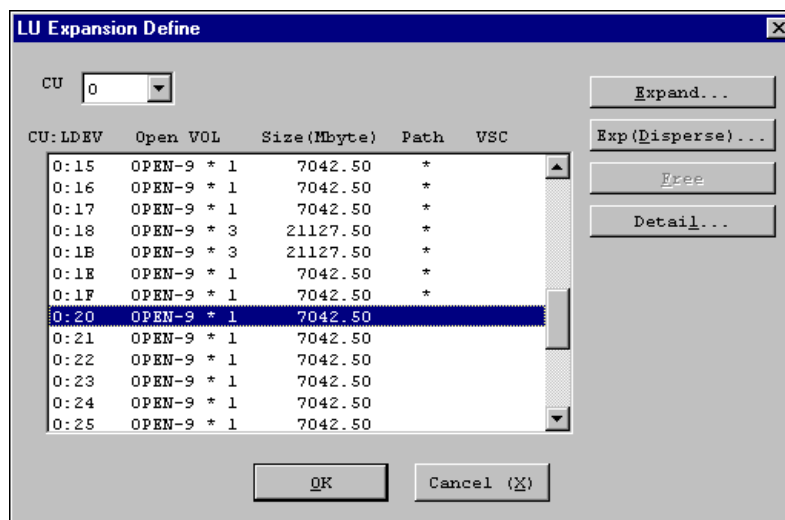
4. Select the Exp (Disperse) button.

The LU Expansion (Disperse) window displays.

All available LDEVs are displayed as OPEN-*X**1 indicating that only one LDEV is present. Existing LUSE volumes are displayed as OPEN-*X**n (*n* indicates the number of LDEVs in the LUSE volume).

LUNs with an asterisk (*) in the Path column are not available for size expansion. Only LDEVs with no SCSI paths assigned can be candidates for LUSE. If these LDEVs must be used, their SCSI paths must be deleted first.

LU Expansion [Disperse] ☒	
OPEN-9 * 1	
Open VOL	0:20
Size/VOL(Mbyte)	7042.50
Total(Mbyte)	7042.50
CU:LDEV	

```
0:21  ▲
0:22
0:23
0:24
0:25
0:26
0:27        [  OK  ]
0:28
0:29  ▼
0:2A        [ Cancel [X] ]
```
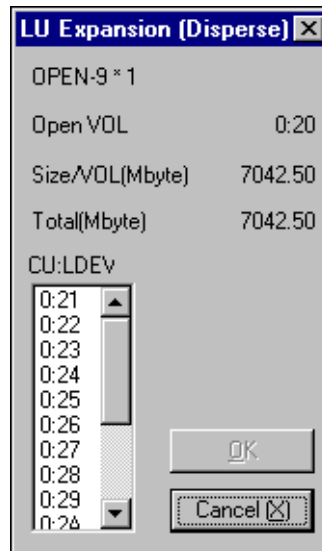
5. Select the LDEVs to be used from the list. To select a series of LDEVs, press the Shift or Ctrl key during selection.

LU Expansion [Disperse] ✕

OPEN-9 * 5

Open VOL	0:20
Size/VOL(Mbyte)	7042.50
Total(Mbyte)	35212.50

CU:LDEV

```
0:21
0:22
0:23
0:24
0:25
0:26
0:27        OK
0:28
0:29       Cancel [X]
0:2A
```
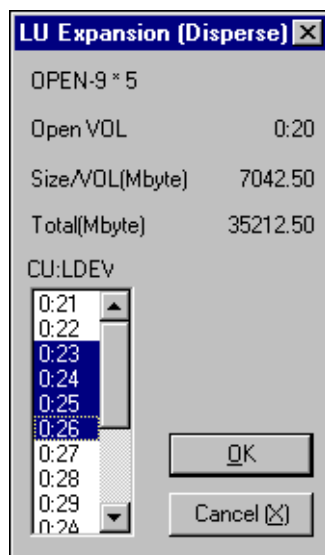
6. Select the OK button.

The LU Expansion Define window displays.

7. Select the expanded LDEV in the volume list.
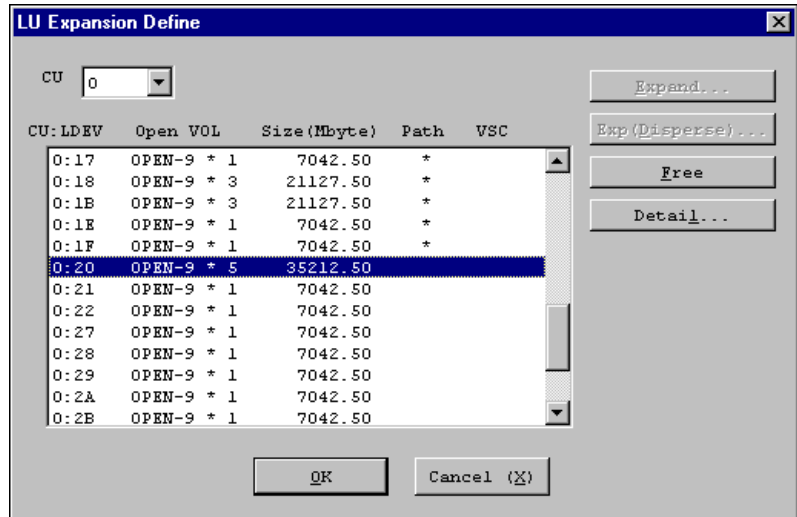
8. Select the Detail button.

The Open Vol Detail window displays.
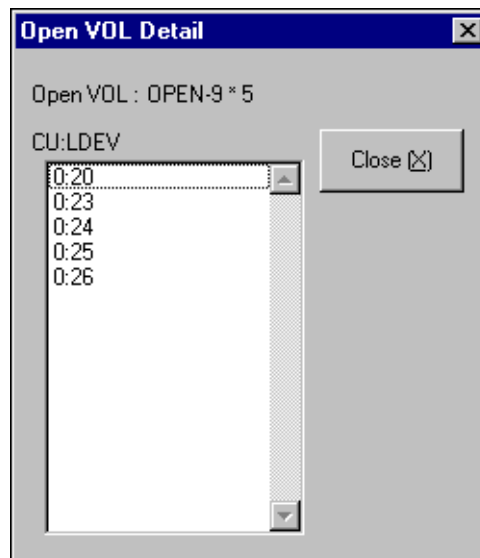
9. Verify the settings are correct and then select the Close button**.**

   The LU Expansion Define window displays.

10. Select OK.

    The LUN Management-LDEV Configuration window displays. The newly configured volume is displayed as OPEN-X*n, where n is the number of LDEVs contained in the volume.
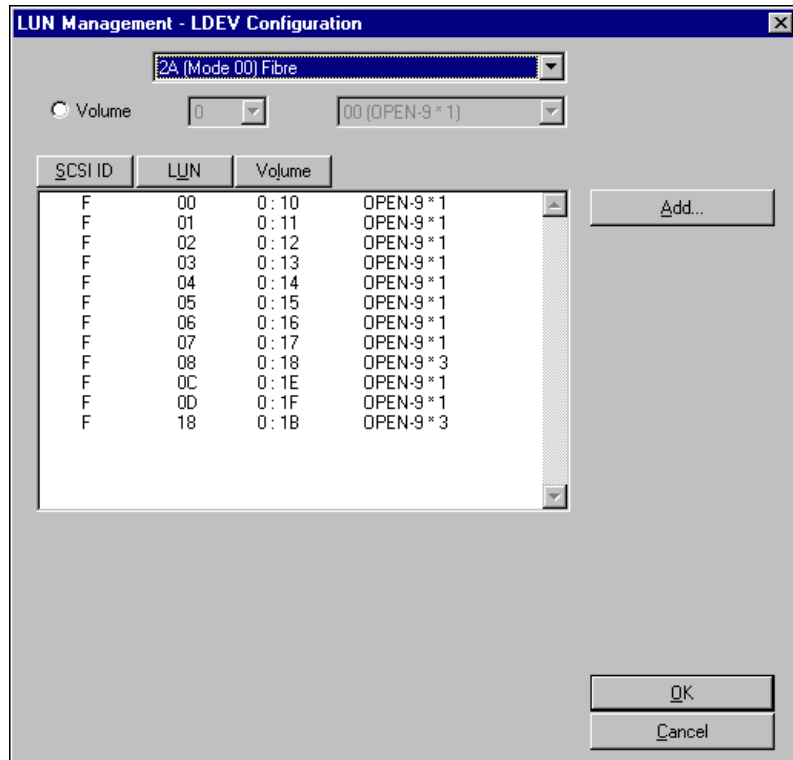
11. Assign a SCSI path to the expanded volume. For the procedure to assign SCSI paths, see "Adding SCSI/Fibre Channel paths" (page 27).

    The LUN Management-LDEV Configuration window displays the new expanded volumes.

12. Select OK to implement the change.

    Select Cancel to cancel the change.

Releasing an expanded LUN

Caution   *Releasing an expanded LUN is a destructive operation. Back up all data.*

To release an expanded LUN:

1. Select Define (Offline) from the RMSCSI Path menu to go to offline mode.

The LUN Management-LDEV Configuration menu displays.

2. Delete the expanded LUN from its SCSI path before releasing it. See "Deleting SCSI/Fibre Channel paths" (page 31).

3. Select OpenVol on the LUN Management-LDEV Configuration window to open the LU Expansion Define window.

4. Select the control unit that controls the desired LUN from the CU drop-down list.

   In the list box, select the volume you want to release.

5. Select the Free button.

The LUN Management-LDEV Configuration menu displays.

2. Delete the expanded LUN from its SCSI path before releasing it. See "Deleting SCSI/Fibre Channel paths" (page 31).

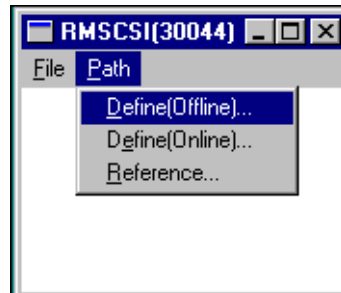3. Select OpenVol on the LUN Management-LDEV Configuration window to open the LU Expansion Define window.

4. Select the control unit that controls the desired LUN from the CU drop-down list.

   In the list box, select the volume you want to release.

LU Expansion Define

CU [0 ▼]

Buttons: Expand..., Exp(Disperse)..., Free, Detail...

CU:LDEV	Open VOL	Size(Mbyte)	Path	VSC
0:13	OPEN-9 * 1	7042.50	*	
0:14	OPEN-9 * 1	7042.50	*	
0:15	OPEN-9 * 1	7042.50	*	
0:16	OPEN-9 * 1	7042.50	*	
0:17	OPEN-9 * 1	7042.50	*	
0:18	OPEN-9 * 3	21127.50		
0:1B	OPEN-9 * 3	21127.50	*	
0:1E	OPEN-9 * 1	7042.50	*	
0:1F	OPEN-9 * 1	7042.50	*	
0:20	OPEN-9 * 1	7042.50		
0:21	OPEN-9 * 1	7042.50		
0:22	OPEN-9 * 1	7042.50		
0:23	OPEN-9 * 1	7042.50		

OK   Cancel (X)
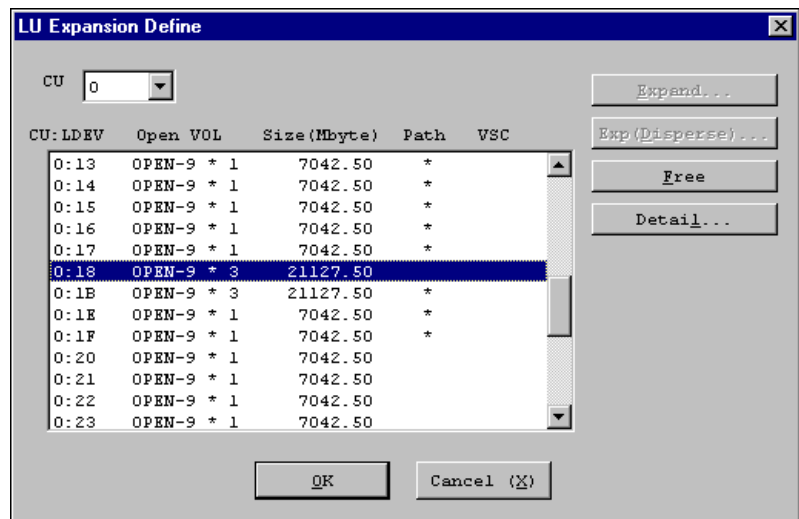
5. Select the Free button.

The LU Expansion Define window now displays the newly released LDEVs.

6. To release another volume, repeat steps 2 though 5.

7. To return to the LUN Management-LDEV Configuration window, select OK.

The LUN Management-LDEV Configuration window now displays
the newly released LDEVs.
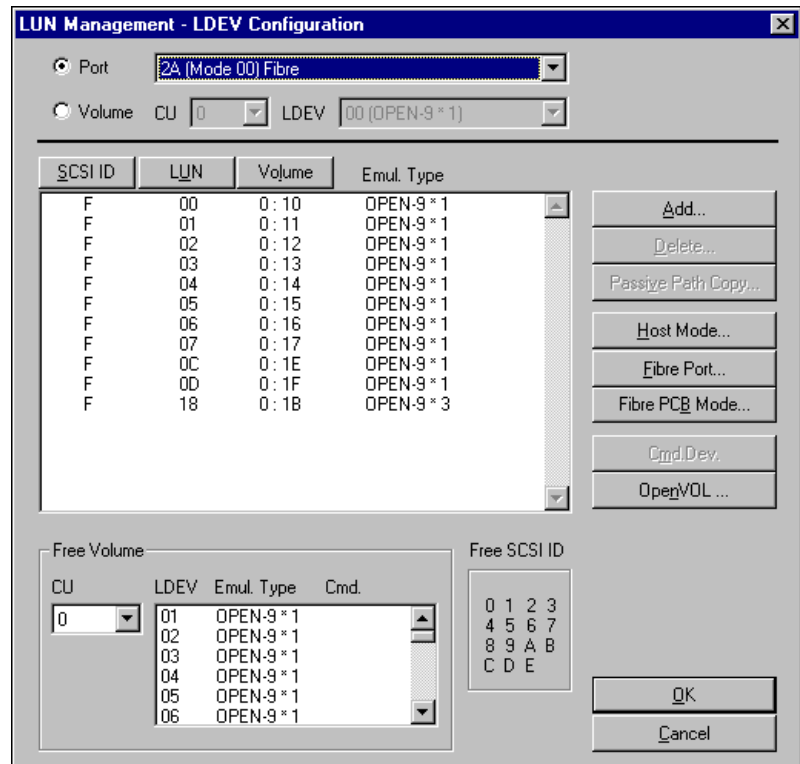
8. To implement the released volumes, select OK.

To cancel the released LDEVs, select Cancel.

Changing the size of an expanded LUN

If you have an expanded LUN that you want to make larger or smaller, you must first delete all SCSI paths to that LUSE volume, release the expanded LUN, and then create a new expanded LUN. Then you will need to recreate SCSI paths to the new expanded LUN.

4

VSC operations

Volume Size Configuration (VSC) allows you to configure custom size volumes that are smaller than normal volumes. VSC improves data access performance by reducing logical device contention as well as host I/O queue times, which can occur when several frequently accessed files are located on the same volume. VSC enables better utilization of the physical storage capacity of the disk array while reducing the amount of administrative effort required to balance storage device I/O work loads. VSC can be used in conjunction with Cache LUN XP while maintaining flexibility in the cache configuration.

VSC operations can be performed by users with administrator or custom VSC access privileges. Users without administrator or VSC access privileges can only view the VSC configuration information for each attached disk array. VSC operations can only be performed when the VSC option is enabled.

The procedures for performing VSC operations are different depending on whether you have an XP256 or and XP512. The procedures are divided into two sections. Make sure you are using the correct set of instructions.

This chapter covers VSC parameters and procedures. The chapter contains three sections:

- "VSC parameters" (page 81)

- "XP256 VSC operations" (page 83)

- "XP512 VSC operations" (page 113)

VSC parameters

This section covers

- VSC specifications
- custom volume capacity
- storage subsystem ID (SSID) requirements

VSC specifications

The following table lists VSC specifications. Each CV has its own assigned unit control block (UCB), and multiple VSC types can be configured within each parity group. The user can add and delete VSC at any time and has complete control over the number of user cylinders and the emulation type of each CV.

Parameter	Specification
Emulation type	OPEN-x
Minimum size of CV	35 MB
Maximum size of CV	OPEN-3: 2.3 GB OPEN-8: 7.0 GB OPEN-9: 7.0 GB OPEN-E: 13.8 GB OPEN-K: 1.7 GB
Size increment	1 MB
Maximum number of volumes (custom and normal) per parity group	128
Maximum number of volumes (custom and normal) per disk array	4096
Control (overhead) capacity required per CV	OPEN-3: 5 MB OPEN-8 & 9: 19 MB OPEN-E: 13 MB OPEN-K: 6 MB

Custom volume capacity

Open system volumes are composed of 512-byte pieces called logical blocks. Logical Block Addresses (LBAs) are used for referring to locations within open system volumes. Use the following table when you configure custom volumes.

Volume Type	Logical Blocks	Capacity (GB = 1000^3 Bytes)	Capacity (GB = 1024^3 Bytes)
OPEN-K	3,661,920	1.875 GB	1.831 GB
OPEN-3	4,806,720	2.461 GB	2.292 GB
OPEN-8	14,423,040	7.384 GB	6.877 GB
OPEN-9	14,423,040	7.384 GB	6.877 GB
OPEN-E	28,452,960	14.568 GB	14.226 GB

Storage subsystem ID (SSID) requirements

Each CU contains four logical subsystems, each of which contain 64 logical devices. It may be necessary to specify an SSID when creating custom volumes. Any value can be used for the SSID of OPEN-*x* devices. The only constraint is that the lowest SSID number used must be evenly divisible by four.

XP256 VSC operations

The first step in performing VSC operations is to convert one or more normal-size volumes to VSC volumes. When you convert a normal volume to a VSC volume, all of the logical blocks in the volume become available for use in custom size volumes (CVs). You can define the first CU during the normal-to-VSC conversion process, and you can define additional CVs as needed under that VSC volume up to a maximum of 32 volumes per parity group (array group) using the install CV process.

If your disk array was configured with one or more VSC volumes during installation, you can bypass the normal-to-VSC conversion process and begin installing new CVs immediately.

VSC operations include:

- viewing the current VSC information
- converting a normal volume to a VSC volume
- installing a CV
- deinstalling a CV
- converting a VSC volume to a normal volume

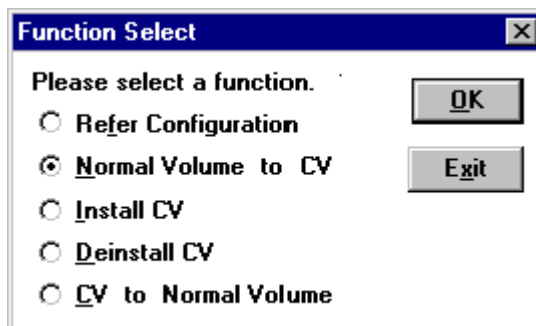The following operations are for the XP256 only.

Starting VSC operations

The following procedure describes how to start VSC operations from the Function Select window.

To start VSC operations:

1. Start and log in to the Remote Control software.

2. Connect to the desired controller.
   The Option Select window opens automatically.

3. Select Volume Size Configuration to start VSC operations.
   The VSC warning message appears to remind you that VSC operations (except Install CV) are destructive.

4. Select OK to continue.

   The Function Select window now opens.

Function Select	
Please select a function.	**OK**
○ Refer Configuration	
● Normal Volume to CV	**Exit**
○ Install CV	
○ Deinstall CV	
○ CV to Normal Volume	

5. Select one of the VSC functions:

Refer Configuration	View the current VSC of the connected disk array. You cannot request changes.
Normal Volume	Convert a normal volume to a VSC volume.
Install CV	Define a new CV under a CV volume. This operation can only be performed on an existing CV volume.
Deinstall CV	Deinstall a CV.
CV to Normal Volume	Convert a CV volume back to a normal volume.

Viewing VSC configuration information

The Refer Configuration function allows you to view the VSC information for the connected disk array. This function can be used to view the disk array configuration information before making changes and to verify changes. When you select Refer Configuration, all VSC functions will be disabled, and you will not be able to request any configuration changes. Using Refer Configuration, you can view the following information:

- parity group configuration of each CU, including the number of LUNs, emulation type, and RAID level of each parity group. This information is displayed on the Device Emulation Configuration window.

- device configuration of each parity group, including the LUN ID, emulation type, and current VSC configuration of each LUN in the parity group. This information is displayed on the Device Emulation Detail window.

- CV configuration of each VSC volume, including the capacity (user and total) and emulation type of each CV. This information is displayed on the Volume Size Configuration Define window.

- LUN ID configuration for each parity group, including LUN IDs assigned to normal volumes and CVs. This information is displayed on the Logical Device ID Configuration and Logical Device ID Define windows.

- storage subsystem ID (SSID) configuration within each CU. This information is displayed on the Subsystem ID Configuration window.

Converting a normal volume to a VSC volume

Caution *The conversion function is a destructive operation. The data on the volume being converted will be lost when the operation is complete. Back up your data as needed before performing this operation.*

The Normal Volume to CV function allows you to convert a normal volume to a VSC volume. Some windows appear more than once during the process to present new information or allow you to perform different functions. The conversion operation does not occur until you select OK on the VSC Confirmation window at the end of the procedure.
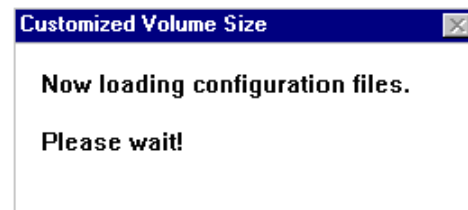
To convert a normal volume to a VSC volume:

1. Open the Function Select window. See "Starting VSC operations" (page 84).
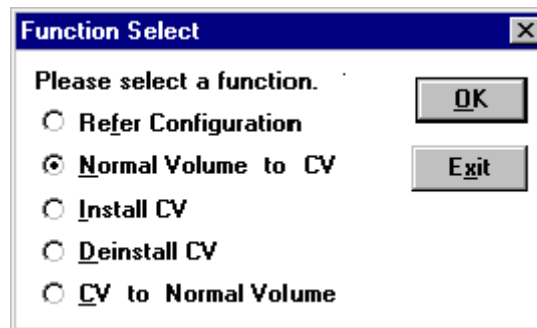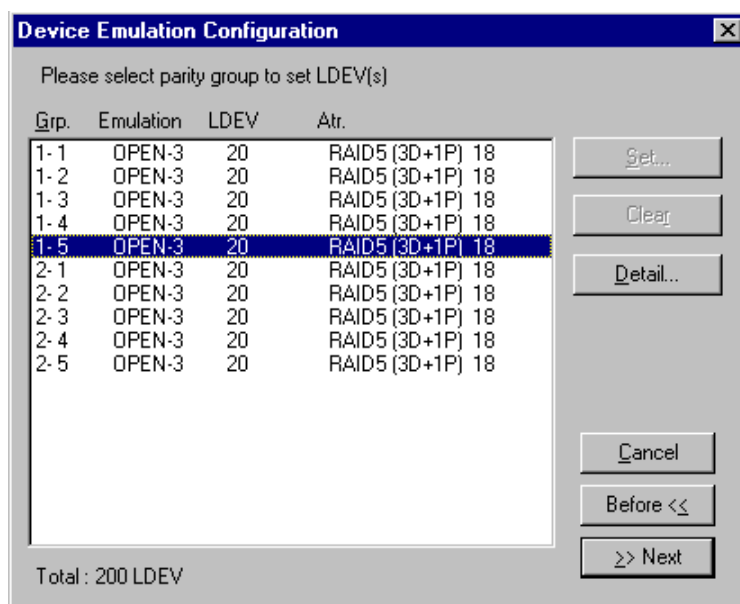

2. Choose Normal Volume to CV on the Function Select window, and select OK.

    LUN Configuration Manager now loads the configuration information.

This process can take several minutes. The Device Emulation Config-uration window displays.
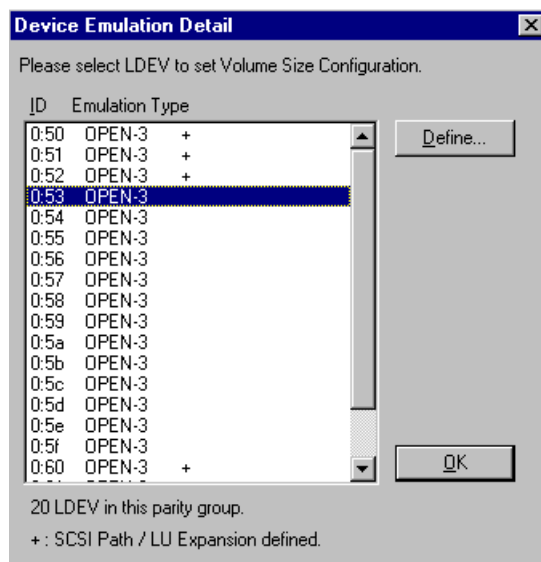
3. Select the parity group that contains the volume you want to convert.
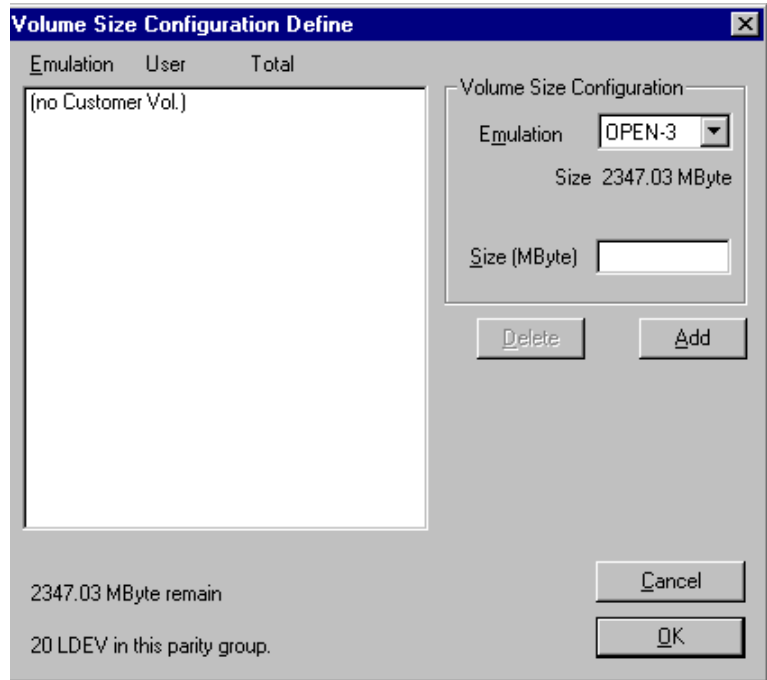

4. Select Detail.

The Device Emulation Detail window opens and displays the LUN configuration of the selected parity group.

5. Select the volume you want to convert.

6. Select Define.

The Volume Size Configuration Define window opens.

Volume Size Configuration Define

Emulation   User   Total

(no Customer Vol.)

Volume Size Configuration

Emulation   OPEN-3

Size   2347.03 MByte

Size (MByte)

Delete   Add

2347.03 MByte remain

20 LDEV in this parity group.

Cancel

OK

7. Select the desired Emulation type, enter the desired Size, and select Add.

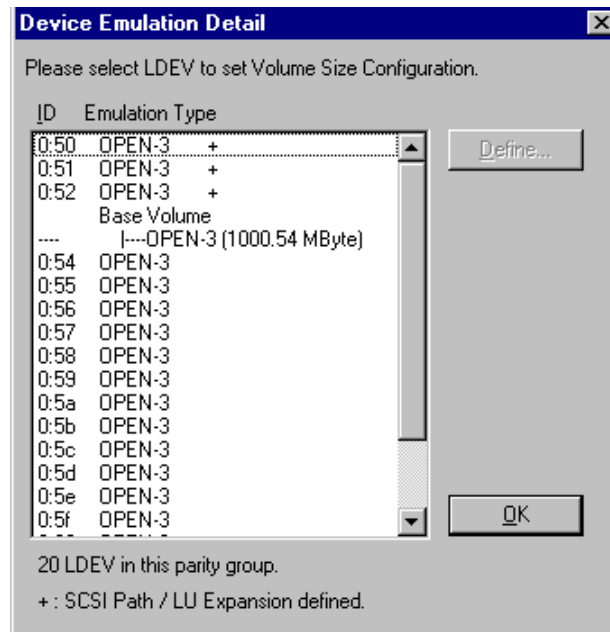   If you make a mistake, select the volume, select Delete, and re-enter the correct information.

   The Volume Size Configuration Define window displays the space used, the space remaining, and number of logical devices in the parity group.

8. When you are finished adding information about the first CV, select OK to continue.

   The manual normal-to-VSC volume change allows you to define only the first CV.

The Device Emulation Detail window now displays the requested normal-to-VSC volume change.

Device Emulation Detail

Please select LDEV to set Volume Size Configuration.

ID   Emulation Type

0:50	OPEN-3	+
0:51	OPEN-3	+
0:52	OPEN-3	+
	Base Volume	
----	|---OPEN-3 (1000.54 MByte)	
0:54	OPEN-3	
0:55	OPEN-3	
0:56	OPEN-3	
0:57	OPEN-3	
0:58	OPEN-3	
0:59	OPEN-3	
0:5a	OPEN-3	
0:5b	OPEN-3	
0:5c	OPEN-3	
0:5d	OPEN-3	
0:5e	OPEN-3	
0:5f	OPEN-3	

Define...

OK

20 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.

9.   To convert another volume, go back to step 5.

10. When the desired new VSC volumes are listed, select Define to continue.

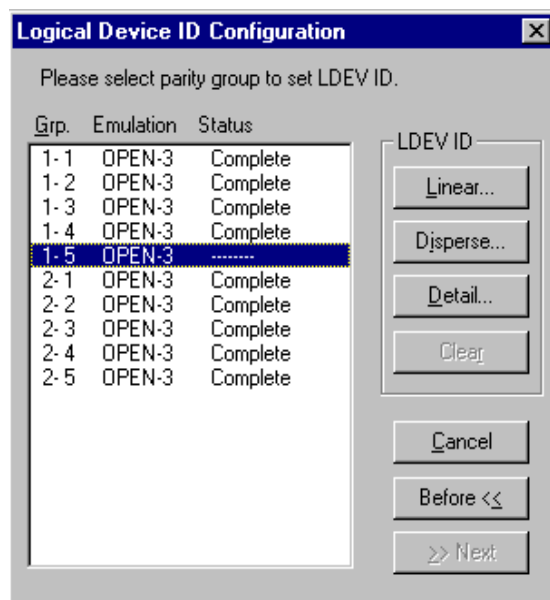The Device Emulation Configuration window opens.
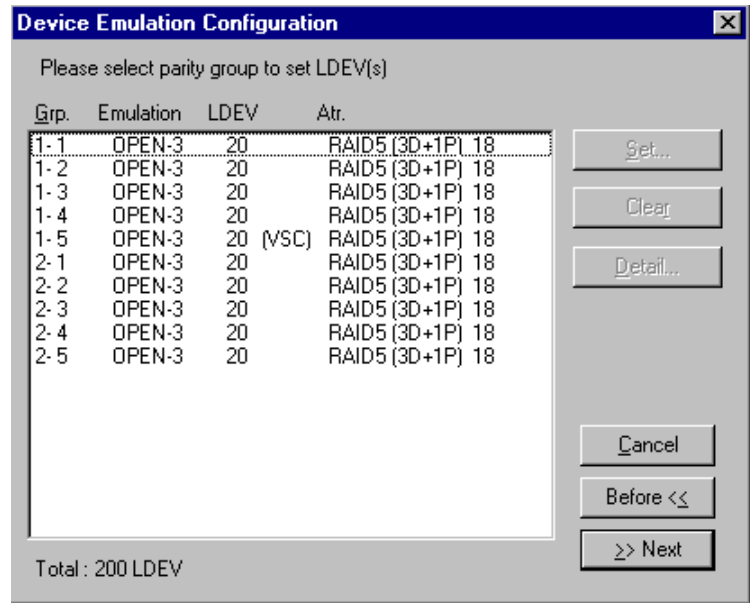
11. Select the parity group containing the requested new VSC volumes, and select Next.

12. Complete the procedure for configuring the new VSC volumes. See the procedure "Configuring new volumes" (page 91).

## Configuring new volumes

To configure new volumes:

The procedure begins with the Logical Device ID Configuration window open.

Logical Device ID Configuration

Please select parity group to set LDEV ID.

Grp.	Emulation	Status
1-1	OPEN-3	Complete
1-2	OPEN-3	Complete
1-3	OPEN-3	Complete
1-4	OPEN-3	Complete
1-5	OPEN-3	-------
2-1	OPEN-3	Complete
2-2	OPEN-3	Complete
2-3	OPEN-3	Complete
2-4	OPEN-3	Complete
2-5	OPEN-3	Complete

LDEV ID

- Linear...
- Disperse...
- Detail...
- Clear

Cancel

Before <<

>> Next

1. Select the incomplete parity group (group status displayed as ------), and select the LDEV ID assignment scheme:
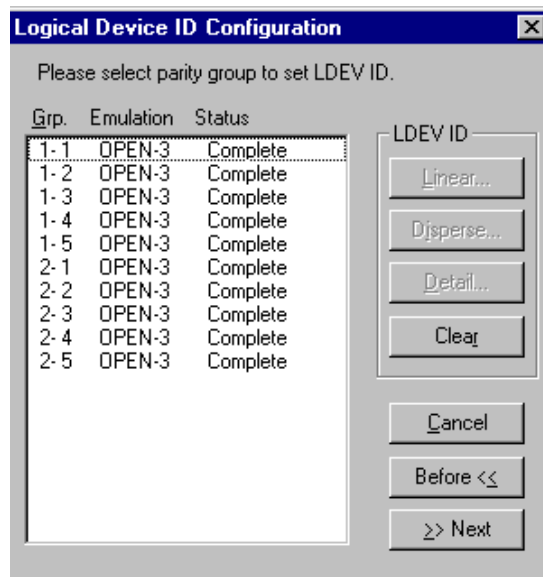
Linear   Assigns the LDEV IDs in sequential order for all unassigned logical addresses within the parity group. The Linear option is appropriate for users who actively balance their disk array work loads.

Disperse   Randomly rotates the LDEV IDs among multiple groups across the disk array, eliminating hot spots and improving data access. The Disperse option is appropriate for users who do not actively balance their disk array work loads.

Detail   Allows manual selection of LDEV IDs.

The Logical Device ID Define window opens and displays the assigned LDEV IDs for each CU.
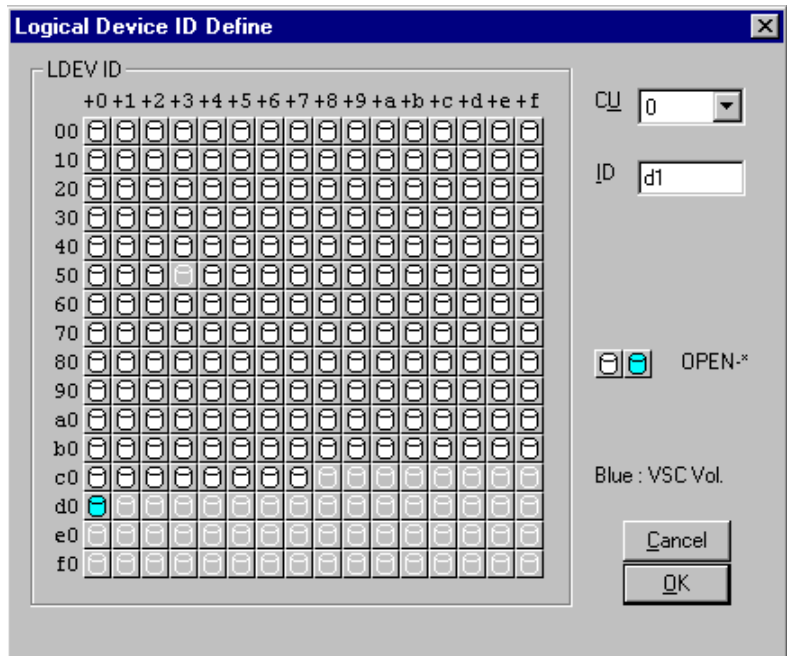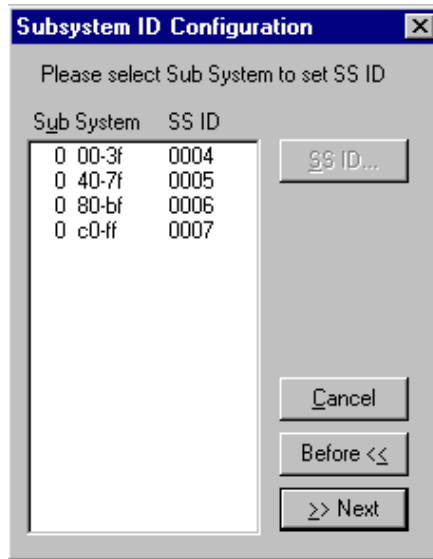

2. Select the CU, enter the LDEV ID, and select OK.

The Logical Device ID Configuration window now displays the status of the parity group as Complete.
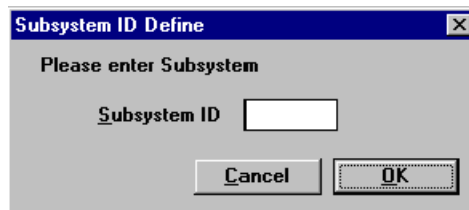

3. Select Next to continue.

The Subsystem ID Configuration window now opens to allow you to assign one or more SSIDs.

Subsystem ID Configuration

Please select Sub System to set SS ID

Sub System	SS ID
0 00-3f	0004
0 40-7f	0005
0 80-bf	0006
0 c0-ff	0007

SS ID...

Cancel

Before <<

>> Next

4. If you do not need to assign an SSID, go to step 8.

5. To assign an SSID to a disk array, select the desired disk array and select the SSID button.

   Each installed disk array (64 LDEVs) is displayed by LDEV range (for example, 40-7f).

   The Subsystem ID Define window opens.

Subsystem ID Define

Please enter Subsystem

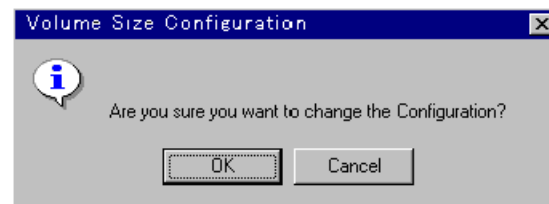Subsystem ID [   ]

Cancel   OK

6. Enter the desired SSID. The SSID must be unique.

7. Select OK. The specified SSID is assigned to the selected disk array.

The Subsystem ID Configuration window displays.
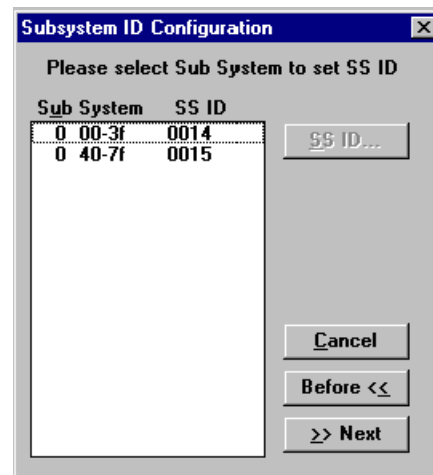
8. Select Next to complete the normal-to-VSC conversion operation. The Volume Size Configuration window displays.

9. Select OK to implement the conversion.

Caution *This operation is destructive. If in doubt, select Cancel to cancel the operation.*

Installing custom volumes

The Install CV function allows you to define one or more new CVs under an existing VSC volume. If there are no VSC volumes, you must convert a normal volume to a VSC volume before installing any CVs.

The install operation does not occur until you select OK on the confirmation window at the end of the procedure.
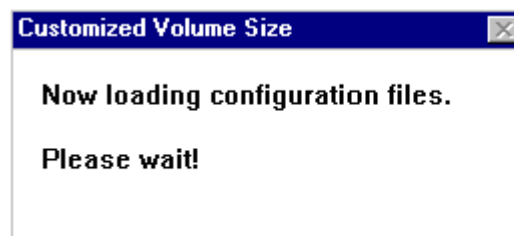
To install custom volumes:

1. Open the Function Select window. See "Starting VSC operations" (page 84).

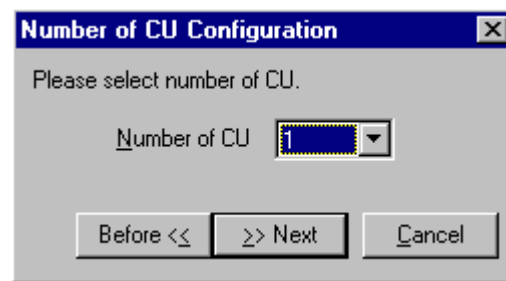2. Choose Install CV on the Function Select window.
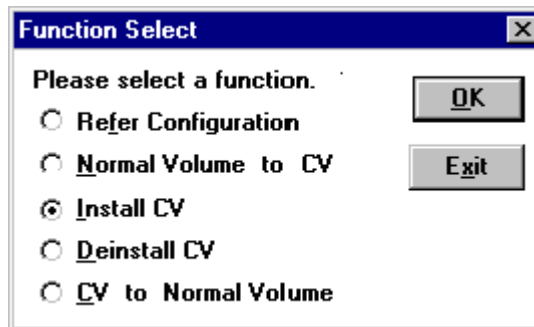
3. Select OK.

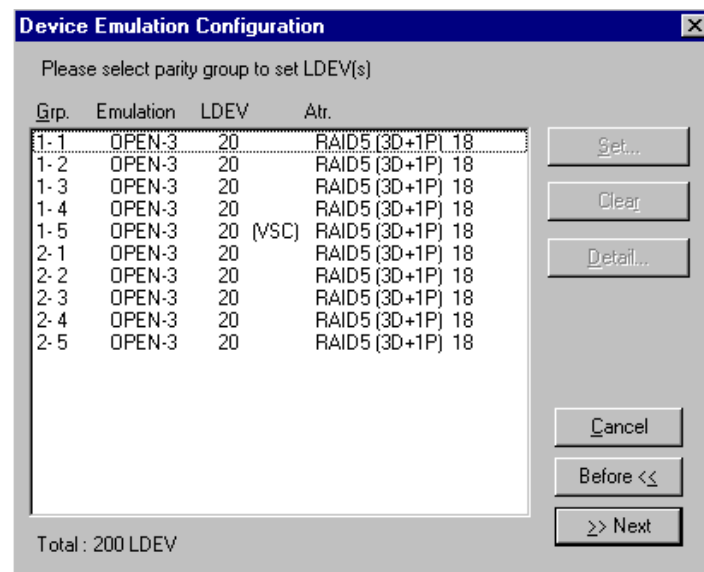   The remote console now loads the configuration information.

This process can take several minutes. When the process is finished, the Number of CU Configuration window displays.
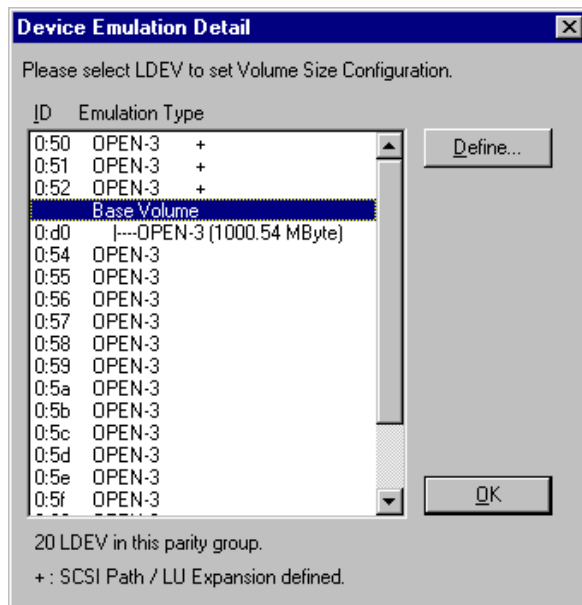
Number of CU Configuration

Please select number of CU.

Number of CU [1 ▼]

[Before <<] [>> Next] [Cancel]

4. Select the CU number, and select Next.

The Device Emulation Configuration window opens.

Device Emulation Configuration

Please select parity group to set LDEV(s)

Grp.	Emulation	LDEV	Atr.
1- 1	OPEN-3	20	RAID5 (3D+1P) 18
1- 2	OPEN-3	20	RAID5 (3D+1P) 18
1- 3	OPEN-3	20	RAID5 (3D+1P) 18
1- 4	OPEN-3	20	RAID5 (3D+1P) 18
1- 5	OPEN-3	20 (VSC)	RAID5 (3D+1P) 18
2- 1	OPEN-3	20	RAID5 (3D+1P) 18
2- 2	OPEN-3	20	RAID5 (3D+1P) 18
2- 3	OPEN-3	20	RAID5 (3D+1P) 18
2- 4	OPEN-3	20	RAID5 (3D+1P) 18
2- 5	OPEN-3	20	RAID5 (3D+1P) 18

[Set...]
[Clear]
[Detail...]

[Cancel]
[Before <<]
[>> Next]

Total : 200 LDEV
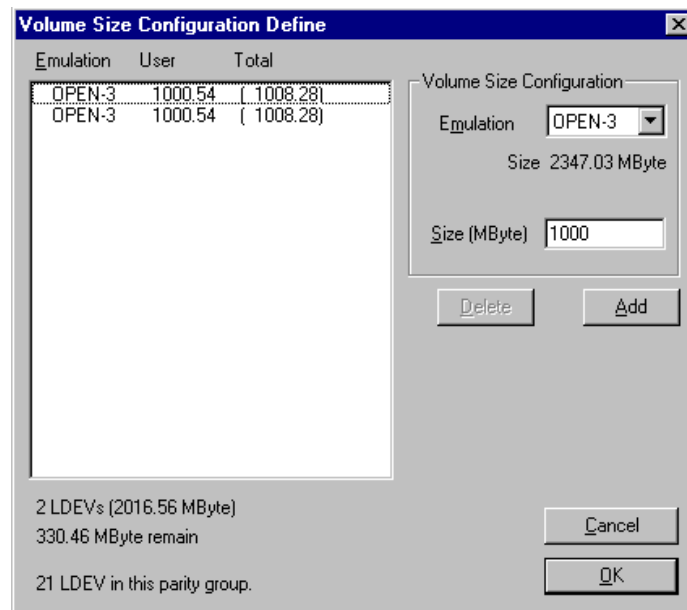
5. Select the parity group that contains the VSC volume, and select Detail.

The Device Emulation Detail window opens.

6. Select the VSC volume in which you want to install the CVs.

Device Emulation Detail

Please select LDEV to set Volume Size Configuration.

ID   Emulation Type

ID	Emulation Type
0:50	OPEN-3 +
0:51	OPEN-3 +
0:52	OPEN-3 +
	Base Volume
0:d0	|----OPEN-3 (1000.54 MByte)
0:54	OPEN-3
0:55	OPEN-3
0:56	OPEN-3
0:57	OPEN-3
0:58	OPEN-3
0:59	OPEN-3
0:5a	OPEN-3
0:5b	OPEN-3
0:5c	OPEN-3
0:5d	OPEN-3
0:5e	OPEN-3
0:5f	OPEN-3

Define...

OK

20 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.

7. Select Define.

The Volume Size Configuration Define window opens.

Volume Size Configuration Define

Emulation   User   Total

OPEN-3	1000.54	(1008.28)
OPEN-3	1000.54	(1008.28)

Volume Size Configuration

Emulation   OPEN-3 ▼

Size 2347.03 MByte

Size (MByte) 1000

Delete   Add

2 LDEVs (2016.56 MByte)
330.46 MByte remain

21 LDEV in this parity group.

Cancel

OK

8. Select the emulation type for the new CV, enter the size. and select Add
   to add the requested CV to the list box.

   If you make a mistake, select the incorrect CV, and select Delete to
   remove it from the list box.

9. Repeat step 8 until you are finished adding the CVs.
   The Cancel button restores this window to its original configuration.

10. When the information displayed on the Volume Size Configuration
    Define window is correct, select OK to continue.

The Device Emulation Detail window now displays the new VSD
volume information.

```
┌─────────────────────────────────────────────────────┐
│ Device Emulation Detail                        [X]   │
├─────────────────────────────────────────────────────┤
│ Please select LDEV to set Volume Size Configuration. │
│                                                       │
│  ID   Emulation Type                                  │
│ ┌─────────────────────────────────┐▲  ┌──────────┐   │
│ │0:50   OPEN-3    +                │   │ Define... │   │
│ │0:51   OPEN-3    +                │   └──────────┘   │
│ │0:52   OPEN-3    +                │                  │
│ │       Base Volume               │                  │
│ │0:d0    |---OPEN-3 (1000.54 MByte)│                  │
│ │ ----   |---OPEN-3 (1000.54 MByte)│                  │
│ │0:54   OPEN-3                     │                  │
│ │0:55   OPEN-3                     │                  │
│ │0:56   OPEN-3                     │                  │
│ │0:57   OPEN-3                     │                  │
│ │0:58   OPEN-3                     │                  │
│ │0:59   OPEN-3                     │                  │
│ │0:5a   OPEN-3                     │                  │
│ │0:5b   OPEN-3                     │                  │
│ │0:5c   OPEN-3                     │                  │
│ │0:5d   OPEN-3                     │   ┌──────────┐   │
│ │0:5e   OPEN-3                     │▼  │    OK    │   │
│ └─────────────────────────────────┘   └──────────┘   │
│                                                       │
│ 21 LDEV in this parity group.                         │
│ + : SCSI Path / LU Expansion defined.                 │
└─────────────────────────────────────────────────────┘
```
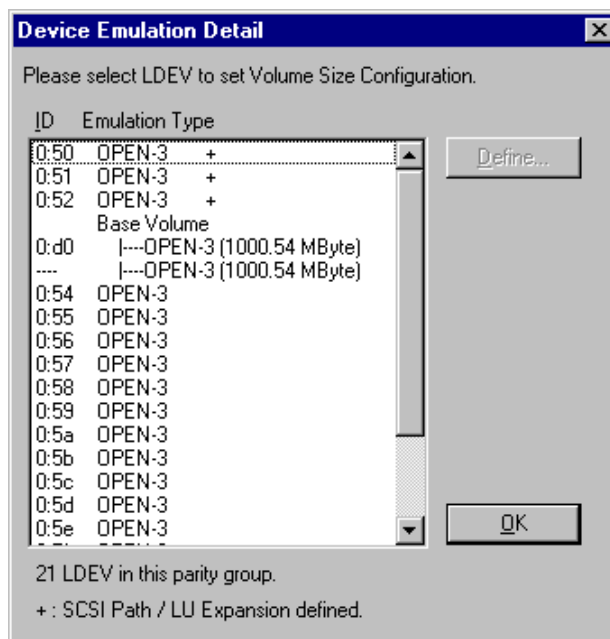
11. Select Define to continue.

    The Device Emulation Configuration window now displays the new
    parity group configuration information.

12. Complete the procedure for configuring the new CVS volumes. See the
    procedure "Configuring new volumes" (page 91).

Deinstalling custom volumes

Caution   *The Deinstall CV function is a destructive operation. The data on the CV(s) being deinstalled will be lost when the operation is complete. The user is responsible for backing up the data as needed before performing this operation.*

The Deinstall CV function allows you to deinstall one or more CVs. The deinstall CV process deletes selected CVs on a VSC volume.

The deinstall CV operation does not occur until you select OK on the VSC Confirmation window at the end of the procedure.

To deinstall custom volumes:

1. Open the Function Select window. See "Starting VSC operations" (page 84).

2. Choose Deinstall CV on the Function Select window, and select OK.
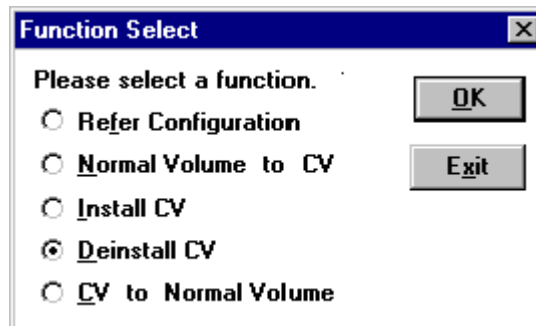
The remote console now loads the configuration information.

Customized Volume Size   ✕

Now loading configuration files.

Please wait!
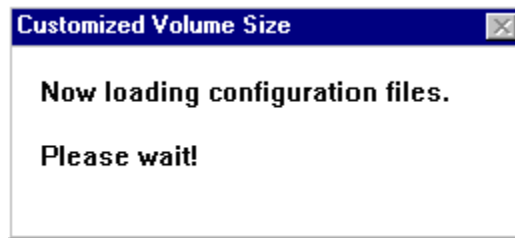
This process can take several minutes.When the process is complete, the Number of CU Configuration window opens.

3. Select the desired CU.

Number of CU Configuration   ✕

Please select number of CU.

Number of CU   [1   ▼]

[Before <<][>> Next][Cancel]
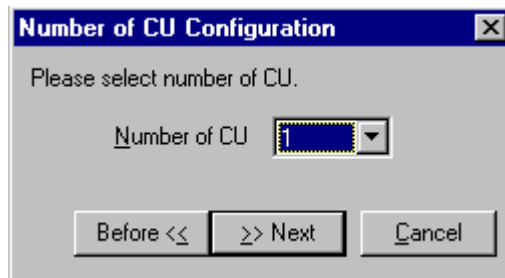
4. Select Next.

The Device Emulation Configuration window opens.

5. Select the parity group containing the CVs you want to deinstall.

Device Emulation Configuration

Please select parity group to set LDEV(s)

Grp.	Emulation	LDEV	Atr.
1-1	OPEN-3	20	RAID5 (3D+1P) 18
1-2	OPEN-3	20	RAID5 (3D+1P) 18
1-3	OPEN-3	20	RAID5 (3D+1P) 18
1-4	OPEN-3	20	RAID5 (3D+1P) 18
1-5	OPEN-3	21 (VSC)	RAID5 (3D+1P) 18
2-1	OPEN-3	20	RAID5 (3D+1P) 18
2-2	OPEN-3	20	RAID5 (3D+1P) 18
2-3	OPEN-3	20	RAID5 (3D+1P) 18
2-4	OPEN-3	20	RAID5 (3D+1P) 18
2-5	OPEN-3	20	RAID5 (3D+1P) 18

Set... Clear Detail... Cancel Before << >> Next

Total : 201 LDEV

6. Select Detail.

The Device Emulation Detail window opens.

7. Select the CV to be deinstalled.

Device Emulation Detail

Please select LDEV to set Volume Size Configuration.

ID   Emulation Type

0:50	OPEN-3	+
0:51	OPEN-3	+
0:52	OPEN-3	+
	Base Volume	
0:d0	|----OPEN-3 (1000.54 MByte)	
0:d1	|----OPEN-3 (1000.54 MByte)	
0:54	OPEN-3	
0:55	OPEN-3	
0:56	OPEN-3	
0:57	OPEN-3	
0:58	OPEN-3	
0:59	OPEN-3	
0:5a	OPEN-3	
0:5b	OPEN-3	
0:5c	OPEN-3	
0:5d	OPEN-3	
0:5e	OPEN-3	

Delete CV

Cancel

OK

21 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.

8. Select Delete CV.

A confirmation window opens.

Volume Size Configuration

[DEF2516i]

These device(s) which you select will be de-installed.
Are you sure?

Yes   No
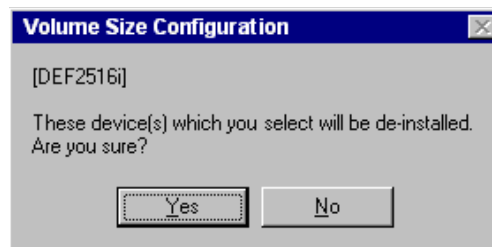
9. Select Yes to deinstall the CV, or No to cancel the installation of this CV.

The Device Emulation Detail window opens, showing the CV as deleted.


```
Device Emulation Detail                                    ☒

Please select LDEV to set Volume Size Configuration.

ID    Emulation Type
┌─────────────────────────────────┐   ┌──────────────┐
│0:50   OPEN-3     +            ▲  │   │   Define...  │
│0:51   OPEN-3     +               │   └──────────────┘
│0:52   OPEN-3     +               │
│▓▓▓▓▓▓▓▓Base Volume▓▓▓▓▓▓▓▓▓▓▓▓▓▓ │
│0:d0    |---OPEN-3 (1000.54 MByte)│
│0:54   OPEN-3                     │
│0:55   OPEN-3                     │
│0:56   OPEN-3                     │
│0:57   OPEN-3                     │
│0:58   OPEN-3                     │
│0:59   OPEN-3                     │
│0:5a   OPEN-3                     │
│0:5b   OPEN-3                     │
│0:5c   OPEN-3                     │
│0:5d   OPEN-3                     │
│0:5e   OPEN-3                     │   ┌──────────────┐
│0:5f   OPEN-3               ▼     │   │     OK       │
└─────────────────────────────────┘   └──────────────┘

20 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.
```
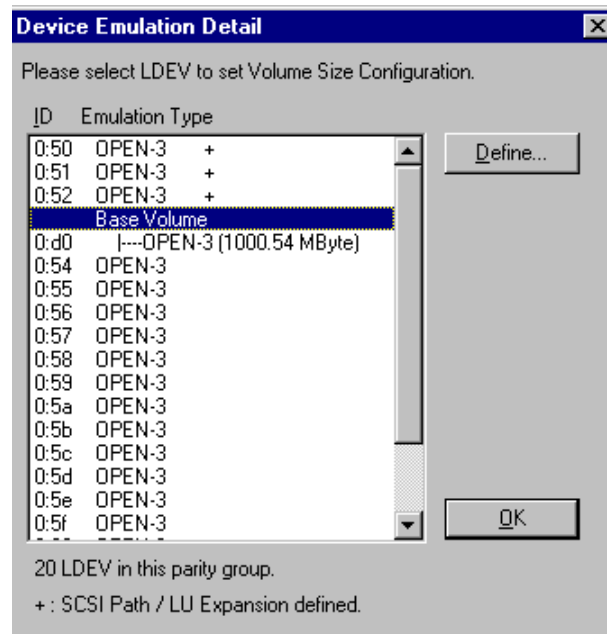
10. Repeat steps 7 though 9 until you are finished deleting the CVs. Select the Cancel button to restore this window to its original configuration.

11. When the information displayed on the Device Emulation Detail window is correct, select OK to continue.

The Device Emulation Configuration window now displays the new parity group configuration information.
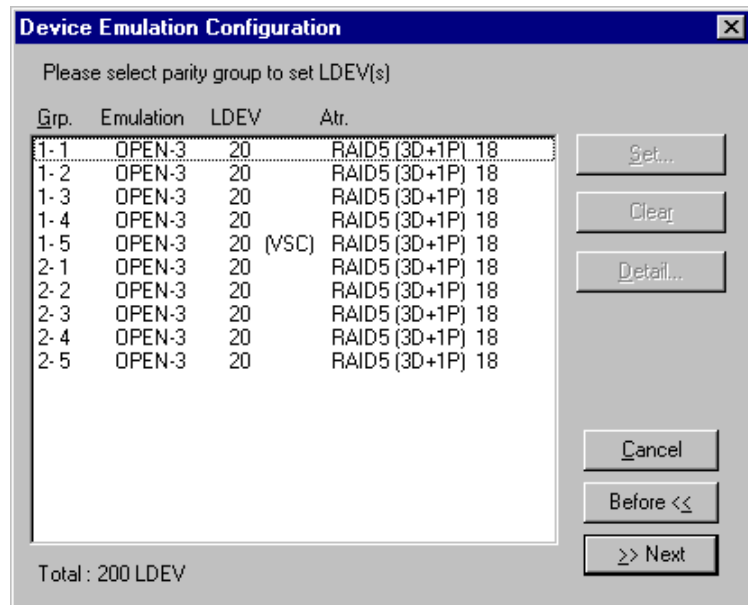
12. Select Next to complete the deinstall CV operation.

The VS confirmation window appears.
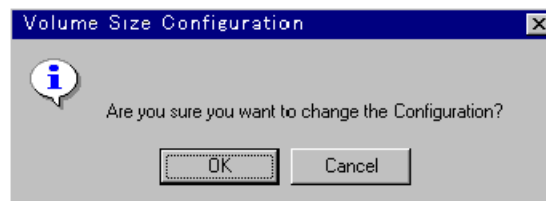
13. Select OK to implement the CV deinstallation.

Caution   *This operation is destructive. If in doubt, select Cancel to cancel the operation.*

Converting a VSC volume to a normal volume

Caution   *The CV to Normal Volume function is a destructive operation. The data on the CV being converted is erased. Back up the data before performing this operation.*

The CV to Normal Volume function allows you to convert a VSC volume back to a normal volume. This operation deinstalls all CVs under a VSC volume and then reformats the VSC volume as a normal volume. If the VSC volume was originally formatted as a VSC volume by the HP representative (using the service processor–SVP), you cannot convert it back to normal using the remote console. If the volume was converted to a VSC volume using the remote console, you can convert it back to normal using the remote console.

The requested VSC-to-normal conversion operation does not occur until you select OK on the VSC Confirmation window at the end of the procedure.

To Convert a VSC volume to a normal volume:

1. Open the Function Select window. See "Starting VSC operations" (page 84).

2. Choose CV to Normal Volume on the Function Select window.
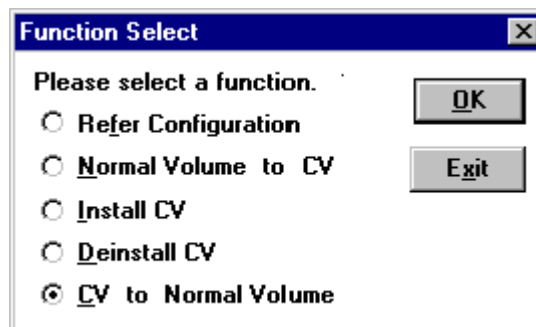
3. Select OK.

The remote console now loads the configuration information.

Customized Volume Size

Now loading configuration files.

Please wait!

This process can take several minutes. When the process is finished, the Device Emulation Configuration window opens.

4. Select the parity group containing the VSC volumes you want to convert back to normal.

Device Emulation Configuration

Please select parity group to set LDEV(s)

Grp.	Emulation	LDEV	Atr.
1-1	OPEN-3	20	RAID5 (3D+1P) 18
1-2	OPEN-3	20	RAID5 (3D+1P) 18
1-3	OPEN-3	20	RAID5 (3D+1P) 18
1-4	OPEN-3	20	RAID5 (3D+1P) 18
1-5	OPEN-3	21 (VSC)	RAID5 (3D+1P) 18
2-1	OPEN-3	20	RAID5 (3D+1P) 18
2-2	OPEN-3	20	RAID5 (3D+1P) 18
2-3	OPEN-3	20	RAID5 (3D+1P) 18
2-4	OPEN-3	20	RAID5 (3D+1P) 18
2-5	OPEN-3	20	RAID5 (3D+1P) 18

Set...
Clear
Detail...

Cancel
Before <<
>> Next

Total : 201 LDEV
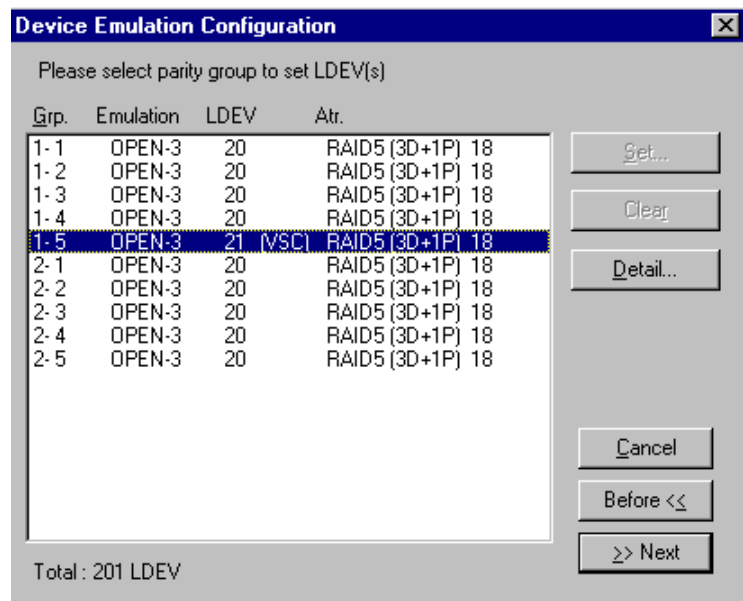
5. Select Detail.

The Device Emulation Detail window opens.

6. Select the CV volume you want to convert to a normal volume.

Device Emulation Detail

Please select LDEV to set Volume Size Configuration.

ID   Emulation Type

0:50	OPEN-3	+
0:51	OPEN-3	+
0:52	OPEN-3	+
	Base Volume	
0:d0	----OPEN-3 (1000.54 MByte)	
0:54	OPEN-3	
0:55	OPEN-3	
0:56	OPEN-3	
0:57	OPEN-3	
0:58	OPEN-3	
0:59	OPEN-3	
0:5a	OPEN-3	
0:5b	OPEN-3	
0:5c	OPEN-3	
0:5d	OPEN-3	
0:5e	OPEN-3	
0:5f	OPEN-3	

Delete CV

Cancel

OK

20 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.
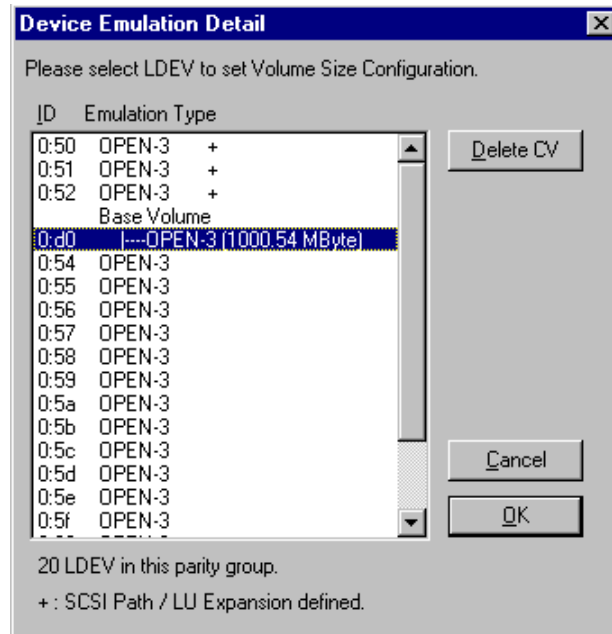
7. Select Delete CV.

The CVs are listed under their VSC volume.

The deinstall CV confirmation window displays.

Volume Size Configuration

[DEF2516i]

These device(s) which you select will be de-installed.
Are you sure?

Yes   No
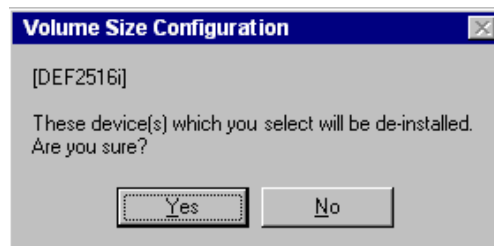
8. Select Yes to continue.

The Device Emulation Detail window now displays the deinstalled volume without an assigned ID.

Device Emulation Detail

Please select LDEV to set Volume Size Configuration.

ID   Emulation Type

```
0:50   OPEN-3     +
0:51   OPEN-3     +
0:52   OPEN-3     +
----   OPEN-3
0:54   OPEN-3
0:55   OPEN-3
0:56   OPEN-3
0:57   OPEN-3
0:58   OPEN-3
0:59   OPEN-3
0:5a   OPEN-3
0:5b   OPEN-3
0:5c   OPEN-3
0:5d   OPEN-3
0:5e   OPEN-3
0:5f   OPEN-3
0:60   OPEN-3     +
```

Delete CV

Cancel

OK

20 LDEV in this parity group.

+ : SCSI Path / LU Expansion defined.
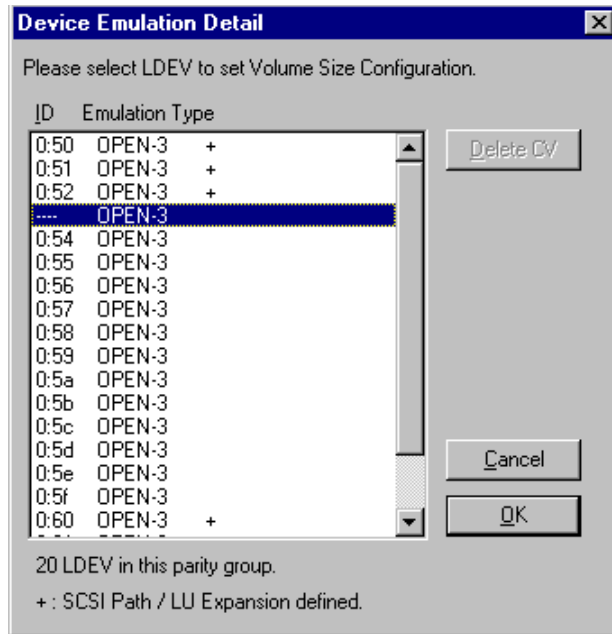
9. Select OK to assign a new LDEV ID.

The Device Emulation Configuration window opens.

10. Complete the procedure for configuring the new VSC volumes. See the procedure "Configuring new volumes" (page 91).

XP512 VSC operations

VSC operations can be performed by users with administrator or custom VSC access privileges. Other users have view-only access to VSC functions. VSC operations include:

- converting an LDEV into space

- installing a CV

- deinstalling a CV

- converting a VSC volume to a normal volume using the Volume Initialize function

You can deinstall selected CVs on a parity group and then reinstall them without deinstalling the entire parity group.

The following operations are for the XP512 only.

Starting VSC operations

To start VSC operations:

1. Log in to the Remote Control software.

2. Connect to the disk array.

   The Option Select window opens.

3. On the Option Select window, select VSC to start VSC operations.

   The VSC warning message appears.
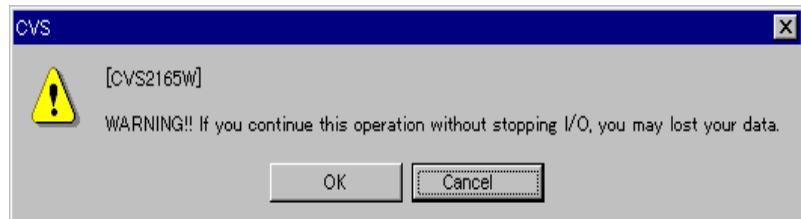
4. Select OK to continue.

   A message reminds you that VSC operations (except Install CV) are destructive.
   The Function Select window now opens.
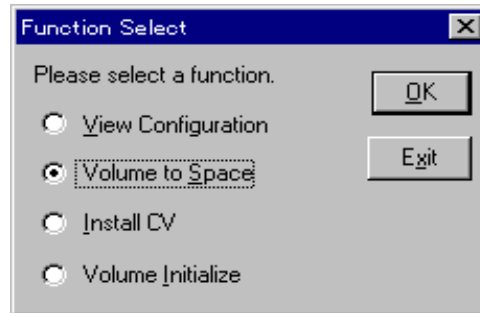
5. Select a VSC function:

View Configuration	View the current VSC configuration of the connected subsystem. See "Viewing VSC configuration information" (page 115). You will not be able to request any changes.
Volume to Space	Converts one or more LDEVs into free space. See "Converting logical volumes to space" (page 120).This function is destructive. Back up the data on the volumes to be converted.
Install CV	Defines a new CV under a VSC volume. See "Defining and installing custom-sized volumes" (page 125). This operation can only be performed on an existing VSC volume.
Volume Initialize	Converts a VSC volume back to a normal volume. See "Converting a VSC volume to a normal volume" (page 134). This function is destructive. Back up the data on all customized volumes.

Viewing VSC configuration information

The View Configuration operation allows you to view the current VSC information for the connected subsystem. When you select View Configuration, all VSC functions will be disabled and you will not be able to request any configuration changes. This function allows access to the information on the following windows:

- Device Emulation Configuration
- Logical Device ID Configuration
- Logical Device ID Define
- Subsystem ID Configuration

Device Emulation Configuration window

The parity group configuration of each CU includes the number of LUNs, emulation type, and RAID level of each parity group. This information is displayed on the Device Emulation Configuration window. The installed parity groups are displayed by location: [frame number] - [parity group number].
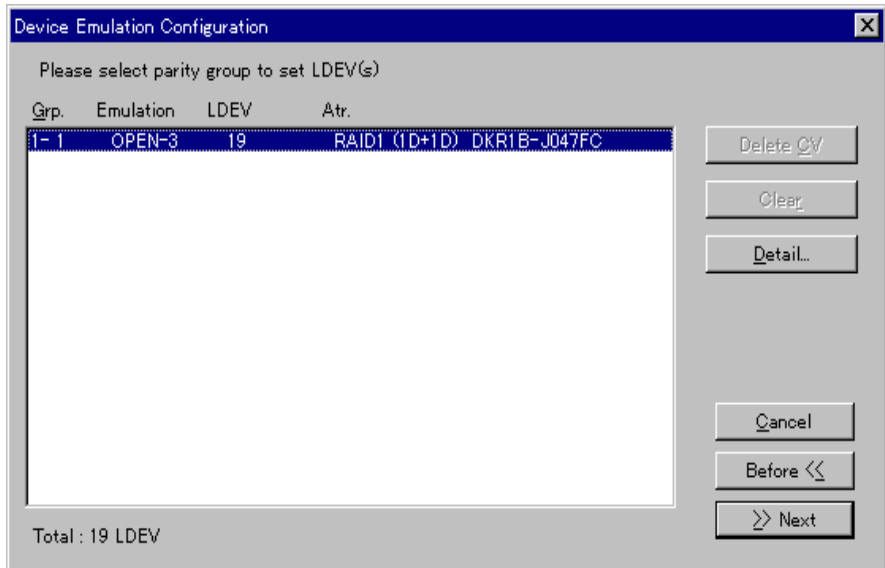
The Device Emulation Configuration window displays the following information:

Grp	The domain number and parity group number of the selected LDEV.
Emulation	The emulation type.
LDEV	The LDEV number.
Atr	(Attribute) The RAID level of parity group. A parity group that already has VSC volumes will display as VSC.
Total	The number of LDEVs in the CU.

Logical Device ID Configuration window

The Logical Device ID Configuration window displays LUN ID configuration for each parity group, including LUN IDs assigned to normal volumes and CVs.
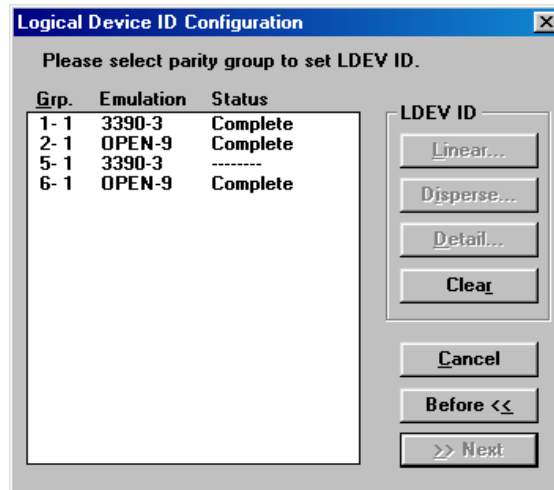
The Device ID Configuration window displays the following information:

Grp	The parity group number of the selected LDEV.
Emulation	The emulation type.
Status	The status of the selected LDEV.
	"Complete" indicates that LDEV IDs are assigned to all installed logical addresses.
	-------- indicates that the LDEV ID assignment for the parity group is not complete.
	"ERROR" indicates that an error has occurred, so see the R-SIM log for error information.

Logical Device ID Define window

The Logical Device ID Define window contains the LUN ID configuration for each parity group, including LUN IDs assigned to normal volumes and VSC volumes.
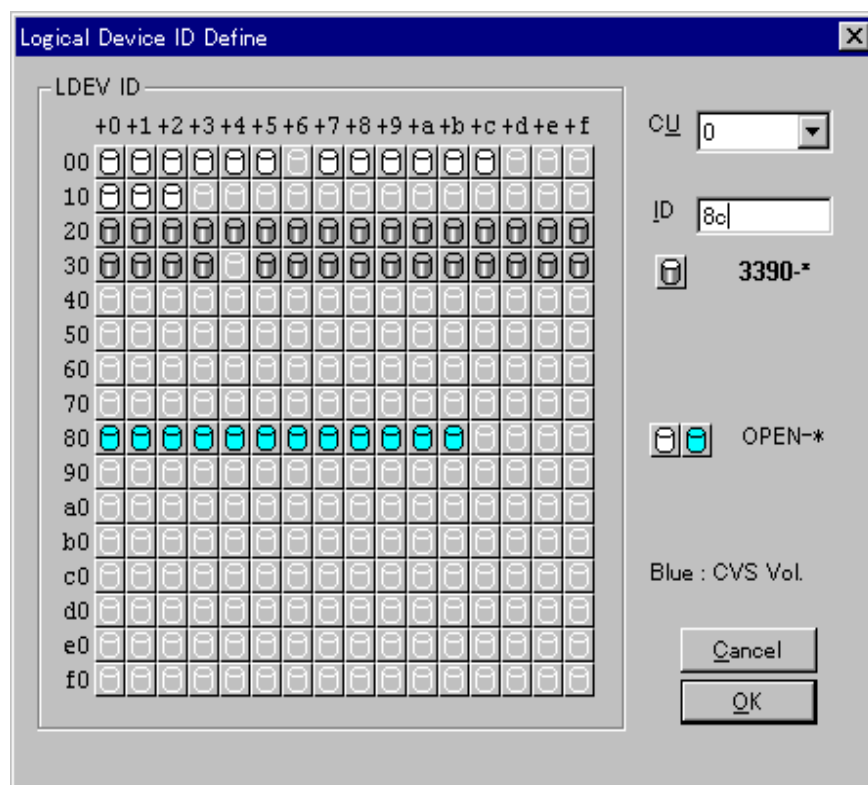
The LDEV ID grid displays the LDEV ID configuration for the selected parity group or LDEV group. Open-system volumes are displayed in white. Customized volumes (if any) are displayed in blue to distinguish them from normal-sized volumes.

Subsystem ID Configuration window

The Subsystem ID Configuration window displays the storage subsystem ID (SSID) configuration within each CU.
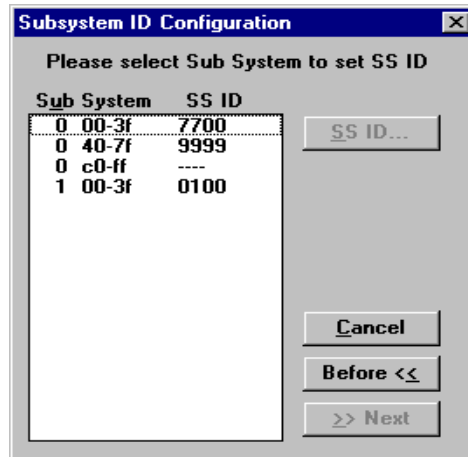
The Subsystem list box displays the storage subsystems by CU number, LDEV ID range, and SSID (if defined).

Converting logical volumes to space

Caution   *The Volume to Space function is a destructive operation. The data on the logical volumes is erased. Back up all data before performing this operation.*

The Volume to Space function allows you to convert one or more logical volumes (LDEVs) to space, which deletes the selected LDEVs from that parity group.

The deleted logical volume(s) will remain as space in that parity group. You cannot convert the last normal LDEV into space because this defines the emulation of the parity group. In addition, any CV (except the last remaining CV) can be deleted (made into space). To delete the last CV, you must use the Volume Initialize function.

To convert a normal volume into space:

1. Choose Volume to Space on the Function Select window, and select OK.
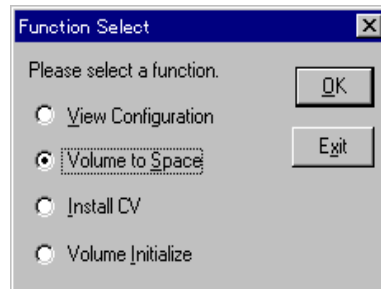
The remote console now loads the configuration information. This process may take several minutes.

CVS

Now loading configuration files.

Please wait!
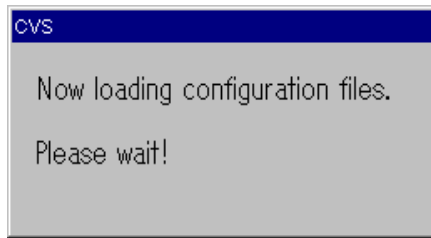
2. When the CVS confirmation message displays, make sure that I/Os of the volumes for which you want to perform the Volume to Space operation have been stopped.

    The CVS confirmation warning message appears.

CVS

[CVS2165W]

WARNING!! If you continue this operation without stopping I/O, you may lost your data.
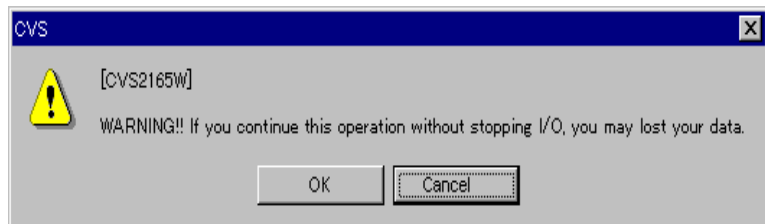
OK   Cancel

3. Select OK to continue the operation or select Cancel to stop the operation and return to the Function Select window.

    The Number of CU Configuration window opens.

Number of CU Configuration

Please select number of CU.

Number of CU   4

Before ≪   ≫ Next   Cancel
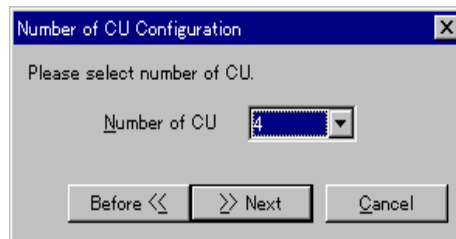
4. Select the number of CUs that are configured for this subsystem, and select Next.

The Device Emulation Configuration window now opens.
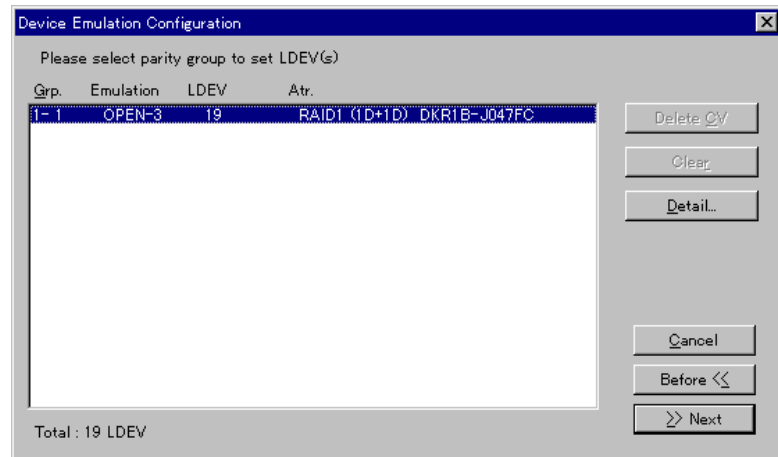
5. Select the parity group containing the logical volumes you want to convert to space (delete), and select Detail.

The Customized Volume Size Define window now opens.
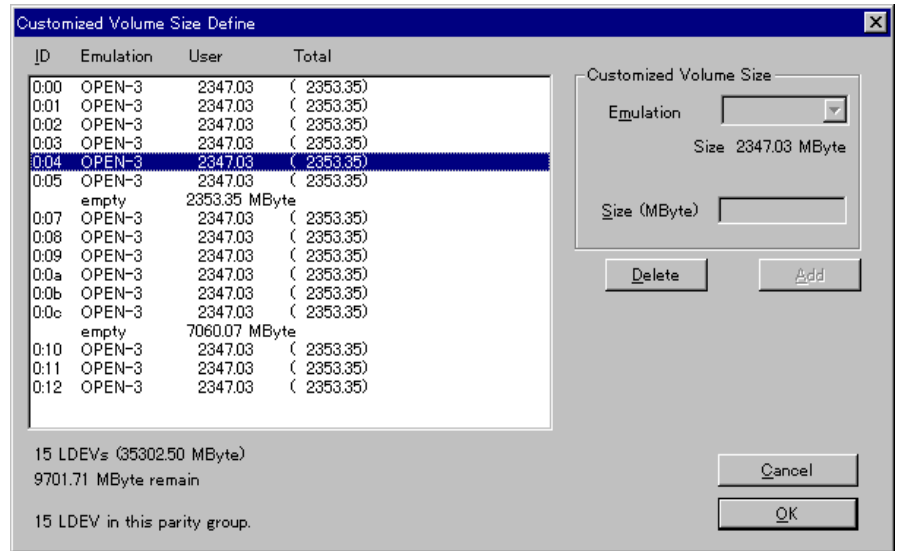
6. Select the volumes to be converted to space, and select Delete.

The Delete button is not available when either all of the LDEVs or the last remaining LDEV in the parity group are selected or the LDEV selected has a plus sign (+) next to it. If the selected volume has one or more assigned SCSI paths, or the volume is either an LDEV security volume or a LUSE volume, it is not available for VSC operations.

The Customized Volume Size Define window now displays the new VSC volume information.
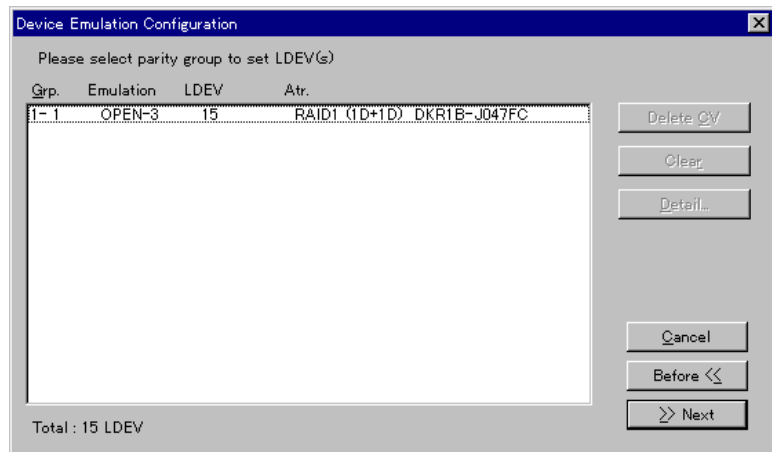
7. Select OK to continue.

   The Device Emulation Configuration window now displays the new parity group configuration information.

8. Select Next to complete the Volume to Space operation.

   The CVS confirmation window appears.
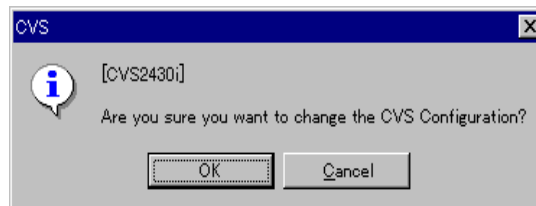
9. Select OK to implement the requested Volume to Space operation.

Caution   *This operation is destructive. If you are not certain that you want to implement the changes, select Cancel to cancel the operation.*

Defining and installing custom-sized volumes

The Install CV function allows you to define and install one or more CVs under an existing volume. You must convert a normal volume to space before installing any custom-sized volumes. The installation operation does not occur until you select OK on the VSC Confirmation window at the end of the complete procedure.

To install a CV:

1. Choose Install CV on the Function Select window, and select OK.
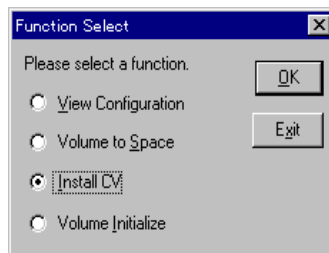
The remote console now loads the configuration information. This process may take several minutes.
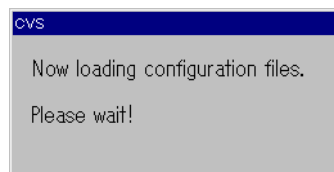
The Number of CU Configuration window opens.
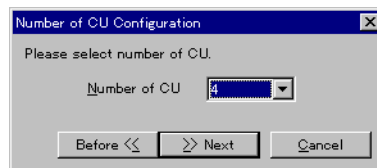
2. Select the number of CUs that are configured for this subsystem, and select Next.

The Device Emulation Configuration window opens.
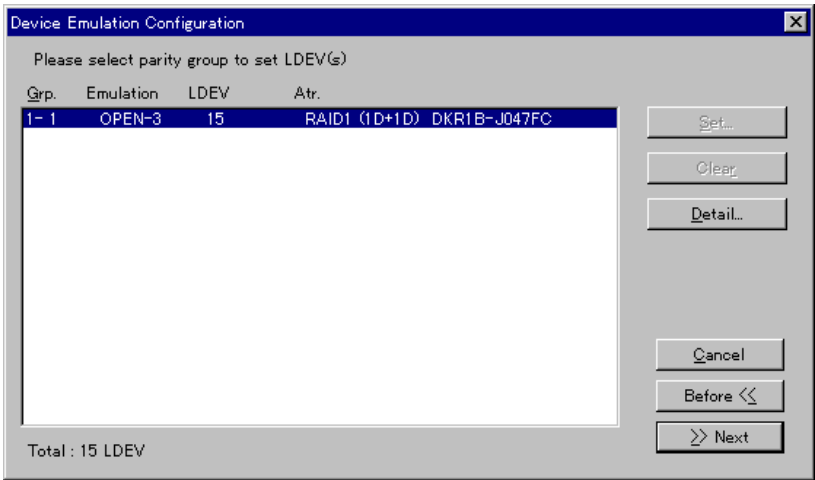
3. Select the parity group that contains the space required to create the CV(s), and select Detail.

The Customized Volume Size Define window opens.
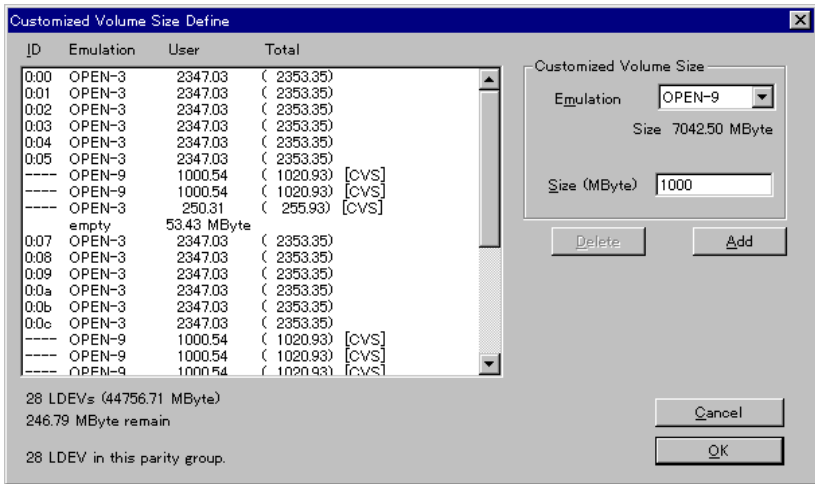
4. Select the emulation type for the new CV.

5. Enter the volume size in MB.

6. Select Add to add the requested CV to the list box.

7. Repeat steps 4 though 6 until you are finished adding the CVs.

   If you make a mistake, select the incorrect CV and select Delete to remove it from the list box.

   The Cancel button restores this window to its original configuration.

8. When the information displayed on the Customized Volume Size Define window is correct, select OK to continue.

   The Device Emulation Configuration window now displays the new parity group configuration information.
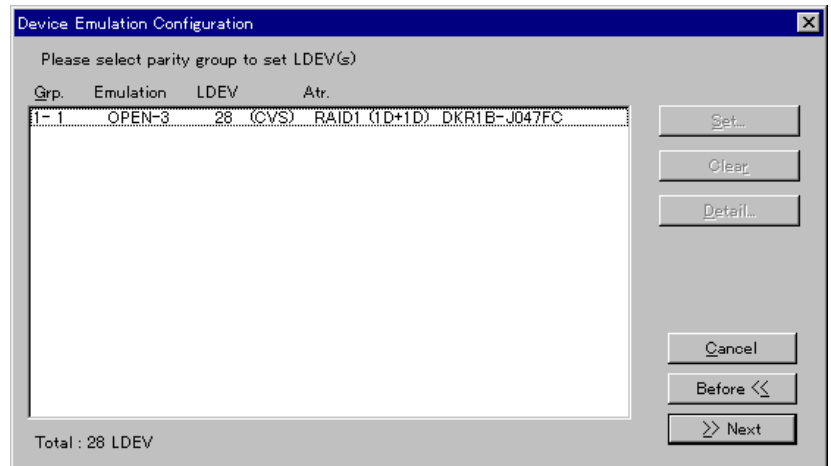
9. Select Next to continue.

   The Logical Device ID Configuration window opens.

10. Complete the procedure for configuring VSC volumes. See "Configuring new volumes" (page 128).

Configuring new volumes

To configure new volumes:
The Logical Device ID Configuration window opens.
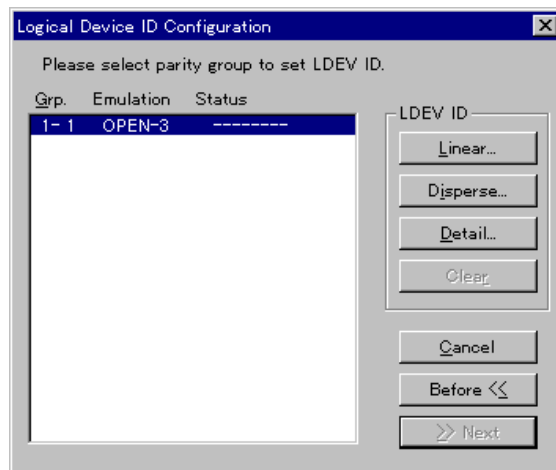
1. Select the incomplete parity group (group status displayed as ------), and select the desired LDEV ID assignment scheme:

Linear   Assigns the LDEV IDs in sequential order for all unassigned logical addresses within the parity group. The Linear option is appropriate for users who actively balance their disk array work loads.

Disperse Randomly rotate the LDEV IDs among multiple groups across the subsystem, eliminating hot spots and improving data access. The Disperse option is appropriate for users who do not actively balance their disk array work loads.

Detail   Allows manual selection of LDEV IDs.

The Logical Device ID Define window opens and displays the assigned LDEV IDs for each CU.
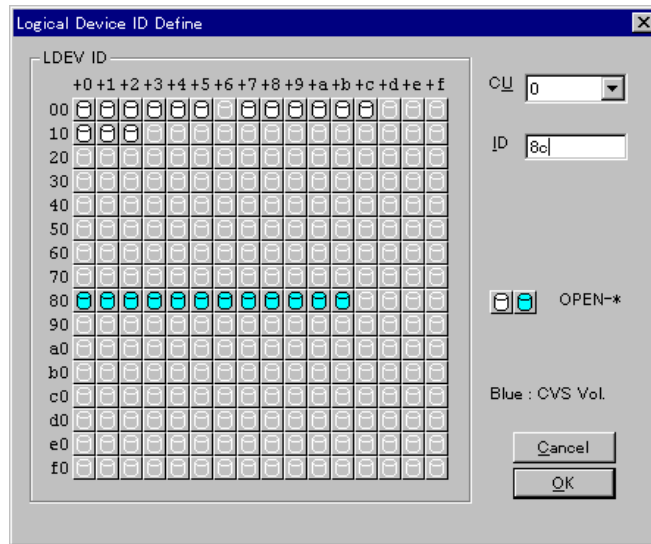
2. Select the CU, enter the desired LDEV ID, and select OK.

The Logical Device ID Configuration window now displays the status of the parity group as Complete.
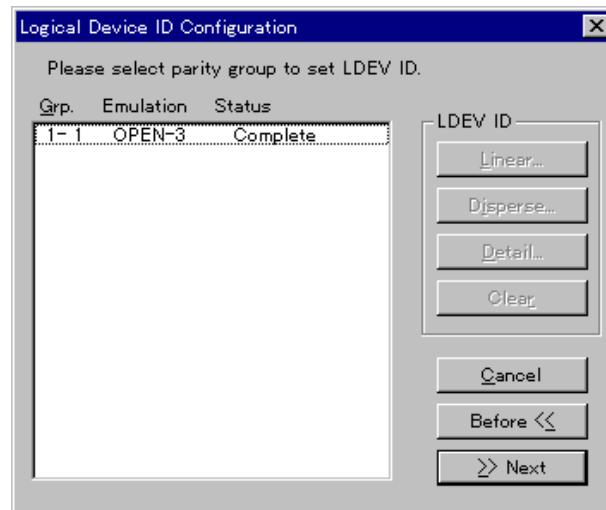
3. Select Next to continue.

The Set SSID Boundary window opens to show the current SSID boundary type (64, 128, or 256). You cannot change the setting here.
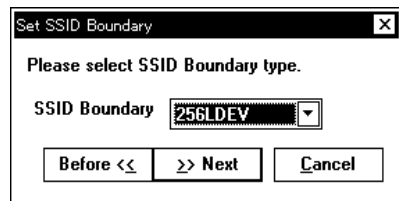
4. Select Next to continue.

The Subsystem ID Configuration window now opens to allow you to assign one or more SSIDs.
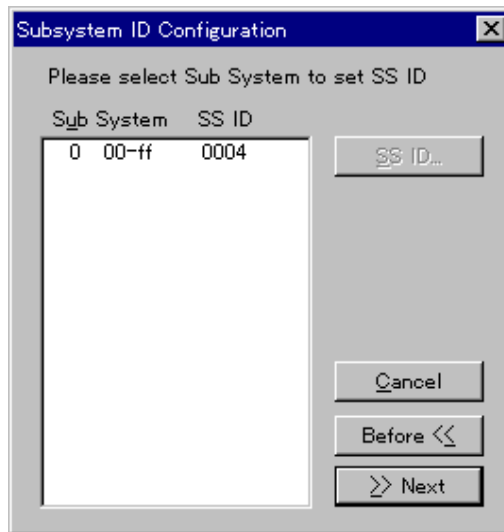
5. If you do not need to assign an SSID, go to step 10.

6. To assign an SSID to a subsystem, select the subsystem.

   The subsystem (64, 128, or 256 LDEVs) is displayed by LDEV range (for example, 40-7f).

7. Select SSID.

   The Subsystem ID Define window opens.
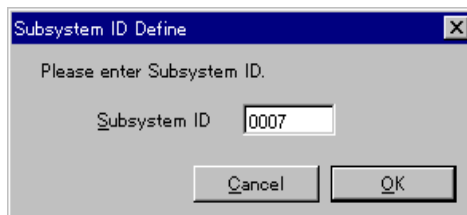
8. Enter the SSID.

   The SSID must be unique and between 0004 and 00FD.

---

9. Select OK.

    The specified SSID is assigned to the selected subsystem.

    The Subsystem ID Configuration window opens.
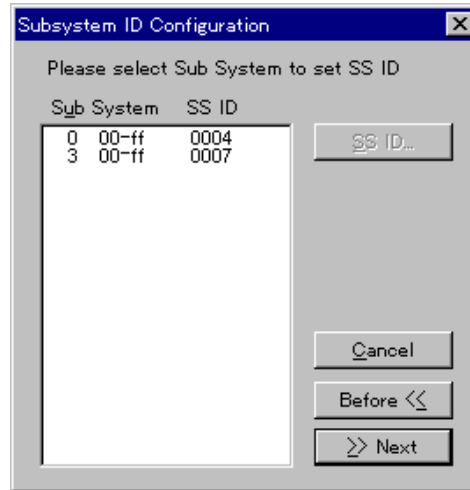
10. Select Next to complete the install CV operation.

    The CVS confirmation window appears.
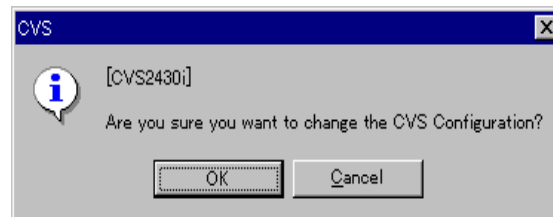
11. Select OK to implement the requested install CV operation (and SSID assignment, if requested).

Deleting VSC volumes

To delete an individual CV within a VSC volume or parity group, use the volume to space operation.

To convert a VSC volume to a normal volume, see the following section.

Converting a VSC volume to a normal volume

Caution   *The Volume Initialize function is a destructive operation. The data on the CV being converted is erased. Back up the data before performing this operation.*

The Volume Initialize function allows you to convert a VSC volume back to a normal volume. This operation deinstalls all customized volumes under a VSC volume and then reformats the VSC volume as a normal volume. The requested volume initialize operation does not occur until you select OK on the VSC Confirmation window at the very end of the procedure.

To initialize a VSC volume (convert a normal volume):

1. Choose Volume Initialize on the Function Select window, and select OK.
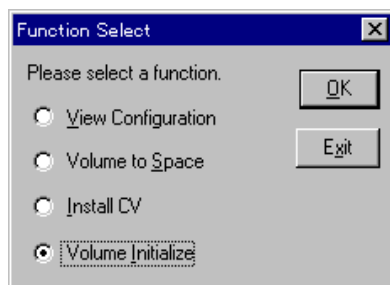
The remote console now loads the configuration information. This process may take several minutes.
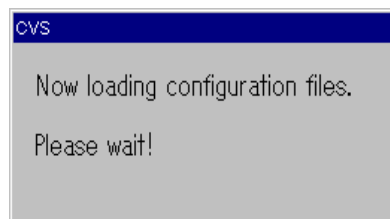
The CVS confirmation message displays.
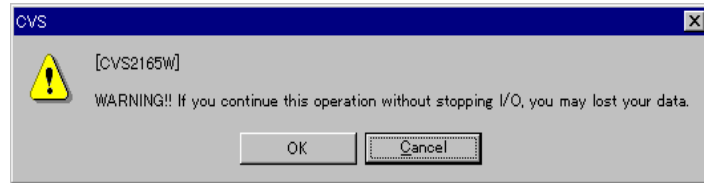
2. Verify that I/Os of the volumes for which you want to perform the Volume Initialize operation have been stopped.

Caution   *If you continue the operation without stopping I/Os, your data may be erased.*

3. Select OK to continue the operation.

   Select Cancel to stop the operation and return to the Function Select window.

   The Device Emulation Configuration window opens.
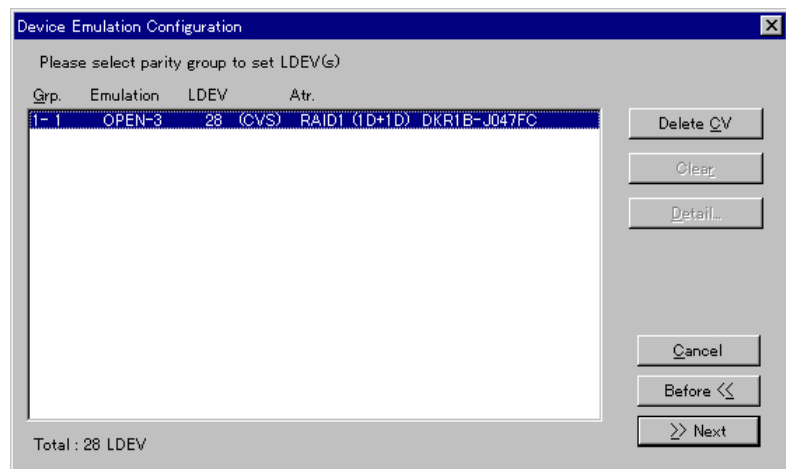
4. Select the parity group containing the VSC volumes you want to convert back to normal, and select Delete CV.

5. After deleting all of the VSC volumes that you want to convert back to normal, select Next.

    The Logical Device ID Configuration window opens.

6. Complete the procedure for configuring new VSC volumes. See "Configuring new volumes" (page 128).

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Troubleshooting

You or the HP service representative can perform troubleshooting operations. See "Error conditions" on page 138 for troubleshooting information.

If you are unable to resolve an error condition, ask your HP service representative for assistance.

Error conditions

The following table describes some general error conditions, along with the recommended resolution for each item. If you are unable to resolve an error condition, please call your HP representative.

Error condition	Recommended action
Remote control will not add or connect with an array.	Check the cabling and the LAN. Make sure that both the computer and LAN cabling are firmly attached and the LAN is operating properly.
The remote console PC experiences an error.	Close the Remote Control application and all other applications. Then restart the PC.

Calling the HP Support Center

If you need to call HP customer support, provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the host system.

If the Remote Control is installed on a remote console PC, check the R-SIM window and note the reference codes and severity levels of recent R-SIMs.

It may help the HP representative in diagnosing the problem if you copy the remote console configuration information onto floppy diskettes, using the FDCOPY function and give the diskettes to the representative. See the Remote Console User's Guide for instructions on using FDCOPY.

Glossary

AL	Arbitrated loop.
AL-PA	Arbitrated loop physical address.
BC	The HP StorageWorks Business Copy XP software program. BC lets you maintain up to nine internal copies of logical volumes on the disk array.
CA	The HP StorageWorks Continuous Access XP software program. CA lets you create and maintain duplicate copies of logical volumes on a remote disk array.
DKC **(disk controller unit)**	The array cabinet that houses the channel adapters and service processor (SVP).
DKU **(disk cabinet unit)**	The array cabinets that house the physical disks.
emulation modes	The logical devices (LDEVs) associated with each RAID group can have one of the following emulation modes. These modes change the behavior of the disks and determine their capacity.

OPEN-3:	2.29 GB	
OPEN-8:	6.84 GB	
OPEN-9:	6.88 GB	
OPEN-E:	13.56 GB	
OPEN-K:	1.74 GB	*(XP48/XP256/XP512 only)*
OPEN-L:	33.94 GB	
OPEN-M:	43.94 GB	*(XP48/XP256/XP512 only)*
OPEN-V:	60.0 GB	*(XP128/XP1024 only)*

FC	Fibre Channel.
FC-AL	Fibre Channel arbitrated loop.

FCP	Fibre Channel Protocol.
GB	Gigabytes.
HBA	Host bus adapter.
HP	Hewlett-Packard Company.
H/W	Hardware.
LD, LDEV	Logical device. An LDEV is created when a RAID group is divided into sections using a selected host emulation mode (for example, OPEN-9 or OPEN-M). The number of resulting LDEVs depends on the emulation mode. The term LDEV is often used synonymously with the term volume.
LU	Logical unit.
LUN	Logical unit number. A LUN results from mapping a SCSI logical unit number, port ID, and LDEV ID to a RAID group. The size of the LUN is determined by the emulation mode of the LDEV, and the number of LDevs associated with the Lun. For example, a LUN associated with two OPEN-3 LDEVs will have a size of 4,693 MB.
LUSE	Logical Unit Size Expansion, a feature which logically combines LDEVs so they appear as a larger LDEV. This allows a LUN to be associated with 2 to 36 LDEVs. Essentially, LUSE makes it possible for applications to access data requiring a large amount of disk space.
LVM	Logical Volume Manager.
MB	Megabytes.
MPE	Maximum physical extent.
OFC	Open Fibre Control.
OPEN-*x*	A general term describing any one of the supported OPEN emulation modes (for example, OPEN-3, OPEN-9, OPEN-L).
	Supported emulation modes: OPEN-3/8/9/E/L.

XP48
XP256

OPEN-K/M are also supported.

XP512
XP1024

OPEN-V is also supported.

OS	Operating system.
PA	Physical address.
path	"Path" and "LUN" are synonymous. Paths are created by associating a port, a target, and a LUN ID with one or more LDEVs.
PC	Personal computer.
port	The number of ports on an XP disk array depends on the number of supported I/O slots and the number of ports available per I/O adapter. The XP family of disk arrays supports Fibre Channel, ESCON, and SCSI ports. *I/O support may vary with the selected disk array.*
	Ports are named based upon their port group and port letter. Examples of port names include CL1-A through CL1-R and CL2-A through CL2-R (letters I and O are skipped).
P-P	Point-to-point.
RAID	Redundant array of independent disks.
RC	HP StorageWorks Remote Control XP. A software product used for managing XP arrays.
remote console	The PC running HP StorageWorks Remote Control XP.
R-SIM	Remote service information message.
SCSI	Small computer system interface.
SIM	Service information message.
SMS	System managed storage.

SNMP	Simple Network Management Protocol.
SVP	Service processor. A laptop PC built into the disk array. The SVP provides a direct interface into the disk array, and is used by the HP service representative only.
TB	Terabytes.
TID	Target ID.
volume	An LDEV can also be called a volume. The LDEV ID is internal to the disk array and is not related to the volume serial number (volser) or LUN number.
VSC	Volume Size Configuration.

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